RAILROAD GAZETTE

FRIDAY, SEPTEMBER 23.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Meetings Next Week.—Minneapolis, Sault Ste. Marie & Atlantic.

Elections.—Asheville & Tennessee, S. F. Kepler President.—Chicago & Calumet River Terminal, Alonzo Stephens President.—Colorado Midland, B. H. Bryant Chief Engineer.—Mighigan Northern, Arthur Meigs President.—Murfreesboro, B. B. Winborne President.—Norfolk & Portsmouth Terminal, William Green President.—Toledo, St. Louis Kansas City, S. R. Callaway President.

Personal.—J. M. Quigley resigns Presidency of Toledo, & St. Louis & Kansas City.

New Companies Organized.—Asheville & Tennessee is organized in North Carolina.—Careyville, Jacksboro & Big Gap files charter in Tennessee.—Cherokee & Dakota files articles in Iowa.—Jellico & Cumberland Gap files charter in Tennessee.—Los Angeles Ocean files articles in California.—Michigan Northern is incorporated in Michigan.—Murfreesboro is chartered in North Carolina.—Norfolk & Portsmouth Terminal is organized in Virginia.—Oneonta & Otsego Valley is incorporated in New York.—Pasadena, Los Angeles & Long Beach files articles in California.—Santa Monica Outlook files articles in California.

Changes and Extensions.—*Alabama:* Montgomery & Florida is extended ten miles. Blountsville Land Co. will build road.—*Arkansas:* St. Louis, Iron Mountain & Southern opens branch to Wynne.—*Dakota:* Fremont, Elkhorn & Missouri Valley is extending road from Rapid City.—*Illinois:* Chicago, Burlington & Quincy is surveying from Beardstown to Camp Point.—*Kentucky:* Chesapeake, Decatur & New Orleans is making surveys.—*Michigan:* Cincinnati, Jackson & Mackinac, will build branch. Duluth, South Shore & Atlantic is completed to Sault Ste. Marie.—*Missouri:* Chicago, Kansas & Nebraska is opened to Kansas City. St. Louis, Arkansas & Texas completes survey of St. Louis extension.—*New York:* Elmira, Cortland & Northern is extended.—*Ontario:* Detroit, Essex & Lake Erie will build from London to Detroit, Mich.—*Ohio:* Lake Shore & Michigan Southern completes Sharpsburgh branch.—*Tennessee:* Richmond & Danville will build branch.—*Texas:* Missouri Pacific opens Taylor, Bastrop & Houston branch.

Traffic.—Anthracite coal shipments for the week ending Sept. 17 show a decrease of 6.8 per cent., as compared with corresponding week last year; bituminous shipments show increase of 25.0 per cent. Cotton receipts, interior markets, show increase of 60.2 per cent., as compared with corresponding period last year; shipments show increase of 26.4 per cent.; seaport receipts show increase of 75.2 per cent.; exports, increase of 35.4 per cent.; cotton in sight is less than at some period last year by 7.4 per cent.

Miscellaneous.—Central Iowa branches are sold. Central of New Jersey files $50,000,000 mortgage.

Contributions.

Balanced Locomotives.

NEW YORK, Sept. 7, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Every man is inclined to look upon any problem from the standpoint which best suits his own ideas. The experiments made by Prof. S. W. Robinson upon bridges, which proved that vibratory stresses of great magnitude occurred in all such structures from the unbalanced action of the locomotive merchanism, served as a ground of complaint for the bridge builders and engineers, who say that if locomotives were provided with perfectly balanced merchanism it would be possible to build lighter bridges equally safe with present heavier structures. It may be laid down as an axiom that whatever may be the opinions of bridge constructors no locomotive builder will feel disposed to forward the bridge interest by any retrograde step in locomotive balancing. It is not a difficult matter to balance the moving parts of the engine in the horizontal plane by means of revolving weights attached within the body of the wheel, but the fact that part of the weight balanced has a motion in the horizontal plane only (the pistons and rods, etc.), and the balance weights revolve in a circle, introduces a new element into the question, for there is nothing to balance the vertical action of the balance weights themselves, and the result is that a locomotive bears more heavily on the track when the balance weight is down than when it is up. Beyond uneven wear of the tires and the introduction of a tendency to slipping, no great harm is thus done unless it be that a slightly heavier rail is needed. But the effect upon bridges is serious, the revolution of the vertically unbalanced wheel, giving rise to a series of impulses in the bridge which accumulate under certain conditions as to time and speed, and bring about stresses greatly in excess of mean load stresses. With the present ordinary tpye of two cylinder engines, the only method of eliminating this injurious vertical action would be to introduce a vertically reciprocating weight actuated from the crank pin and equal in weight to the rectilinearly moving parts of the engine. With this provision the vertically unbalanced portion of the revolving weights in the wheel would balance the working parts of the engine horizontally and be themselves balanced vertically by the vertically moving addition. It is not probable that such a device would come into general use, though it would be absolutely effective in giving an exact all round balance to the locomotive. The use of three cylinders, as on the Webb engine, but arranged so that the piston of the central cylinder should move simultaneously with but opposite to the two outer cylinders has been suggested. This would necessitate the two outer pistons moving simultaneously and the fatal defect of dead points being introduced, an auxiliary small engine would require to be carried so as to turn the engine off its dead points; thus a further complication would be introduced, a most undesirable thing in a locomotive. A prominent locomotive man, speaking to us a few days ago on the question of of the compound locomotive, laid special stress on this point, arguing strongly that even if fuel were saved, the losses through longer detention in the shop for repairs and the hundred little things that are added with every extra detail would probably nullify the apparent economic gain. Indeed, of late years the necessity for simplicity is more than ever recognized and the most successful innovation upon locomotive practice which has yet appeared—the "Strong" locomotive—owes its present good position not merely to the fact that it is an economical engine but because it has also a boiler suited to the highest pressures hitherto carried in locomotives, and yet formed in the simplest manner, dispensing with the innumerable stays rendered necessary in the older and unscientific forms of construction. Hence it is that the question of perfect balance is one fraught with many difficulties. The only apparent solution lies either as indicated above or in further multiplication of cylinders, two on each side of the engine in the same plane being the fewest possible in a self-starting engine. Mechanical engineers may do well to study the question, but it is extremely doubtful if for the sake of saving a few pounds on our bridges we should be wise in increasing the complexity of the machine on which the successful working of a railroad depends so greatly.

W. H. BOOTH.

The Grand Central Station.

TO THE EDITOR THE RAILROAD GAZETTE:

In an article in your issue the 16th inst., concerning improvements on the Harlem Division of the New York Central & Hudson River road, it is stated that "the delays in getting trains into the Grand Central station are already serious and constantly burdensome, and the time is not far distant when heroic measures of relief must be undertaken."

Permit me to draw your attention to the fact that the delays that are so constantly burdensome are almost *all* due to three varieties of causes.

First. Delays to heavy incoming western trains, held back for drill trains and locals of less importance, more easily and readily moved.

Second. By the entirely uncalled for and impracticable flying of engines.

Third. By the apparently prevalent notion among the signal and yard men that an interlocking switch and signal system is better run by shouting and gesticulation than by the semaphores provided for the purpose.

As to the first cause, anyone taking the trouble to watch the traffic can vouch for its existence, and as well wonder why it should be allowed since holding back these trains where they do makes it practically impossible to regain headway sufficient to properly "come in." To see a light engine (not scheduled to leave for half to three-quarters of an hour) given rights to use the crossover, say at 7 p. m., when both the New York Central Special Express and the Shore Line Limited are due, with only two minutes interval, is no exaggerated sample of daily practices. As to the second cause: With the exception of a very few "locals," not an engine enters the station that has not ample lay over to be handled with its train. Considering that it is always safer, would save in this case 60 per cent. in movement and signaling and make 300 yards of track more available for drilling and storing cars, the backing and filling process, even during the busiest hours, to get one heavy train in at a time is, mildly speaking, *undesirable* at least. As to the third cause: Compare the yard room of the Broad street station of the Pennsylvania road, note that it serves for more than double the traffic of the Grand Central Station, and then compare the "row" made at each, and the result will be but too convincing.

With the whole square bounded by 47th and 48th streets, Lexington and Fourth avenues available, and the Mott Haven storage yard possible, it would hardly seem to require "heroic measures" to remodel the plant to readily accommodate all the probable requirements of several as yet untabulated schedules. And perhaps some day adequate waiting rooms—a ladies' room where ladies *can* wait, and several other not to be despised facilities offered by all companies considered first-class, may as well blossom out! Who knows?

Loco.

[Some comment on this letter will be found in the editorial columns.—EDITOR RAILROAD GAZETTE.]

The Strong Locomotive.

NEW YORK, Sept. 20, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The tests conducted by M. Marié, the results of which you quote, were made with an engine especially prepared, while the Lehigh Valley engines at the time of the trial were doing their regular everyday work, which was decidedly unfavorable to high economy. No American railroad company would think of allowing a passenger train to run at a speed of but 17.4 miles per hour, on a rising two per cent. grade, neither would an eight coupled engine having 2,150 sq. ft. of heating surface be permitted to pull a train weighing only 241,398 lbs.; and I believe that if the Paris-Lyons engine tested were brought out here and run regularly on the Lehigh Valley, using either anthracite or bituminous coal as it comes from the mines of Pennsylvania, it would do no better than, if indeed as well as, the ordinary link motion consolidation engine, or any engine having equal amounts of heating surface and cylinder capacity. You, however, assert that this French engine has made an extraordinarily good record, without giving any data as to the details of the test, or the conditions under which the engine was worked, naturally leading one to suppose that the conditions under which M. Marié's engine and those of the Lehigh Valley company were tried, were practically the same.

In this connection I would like to remark, that although European locomotives are supposed by many to be more economical than those used in this country, their duty is generally expressed in pounds per mile run, but when we come to examine the train load we find that the European load is far lighter than the American. Mr. Dorsey's figures in his paper comparing English and American railroads bear this out. Comparing the engines of the two countries on a common basis, the American engine is far from being a wasteful machine.

Returning to the point again. When speaking of the French test, you give figures giving a horse power for so many pounds of fuel consumed, but make no mention of the fact that all the three varieties of fuel used were patent "briquettes," very rich in carbon, and containing but 6.9 per cent. ash, and whose calorific value, according to M. Marié himself, was equal to Cardiff coal, which is well known to be one of the best steaming coals to be found; while you also make no mention of the fact that the Lehigh Valley engines, as the report shows, used various grades of coal, some being slack or screenings, whose value is about one-fourth that of "run of mine" coal. Clearly, no comparison can be made without equating, which has not been attempted, or the necessity for it even hinted at. Surely evidence has been admitted that should have been excluded.

M. Marié made his tests without the use of indicators or dynamometers of any kind, "such delicate instruments," to quote from his paper read before the British Institution of Mechanical Engineers "being liable to give rise to errors Indicators * * * in general give accurate results only from stationary engines working at slow speeds." Knowing as we do that indicators are and have been for some time made which register with extreme accuracy at speeds far in excess of the fastest a locomotive is ever called upon to run at, such remarks as these require no further comment.

This French engineer obtained his performance figures by the use of the following formula:

Work done $= W \times L \times r + W \times h$

Where W = total weight of train including engine and tender in pounds.

L = distance run in feet.

r = coefficient of adhesion; taken as $\frac{1}{232.5}$.

h = height of train ascent.

Let us apply this formula to the case of Lehigh Valley engine No. 444 when working up the grades between Sugar Notch and Fair Haven, which is very nearly identical with that worked over by the Marié engine. These two stations are 63,402 ft. apart, and Fair View is at an elevation of 1014.754 ft. above Sugar Notch. The following table gives the various grades into which the total distance of 63,402 ft. is divided. The trip of May 11 is taken at random from the tables, and works out as follows:

"Trip of May 11th, 1887. Sugar Notch to Fairview.

Distance.	Grade.	Tangent.	Rise.
1,350 ft.	.16	1,350	2.160
2,000 "	.10	2,000	2.000
2,100 "	.05	2,100	1.050
107 "	1.60	107	1.720
1,693 "	1.60	....	27.088
11,136 "	1.80	6,107	
6,864 "	1.80	4,018	
7,600 "	1.80	5,934	974.736
15,840 "	1.80	7,405	
11,167 "	1.80	2,614	
1,545 "	1.80	536	
2,000 "	.30	743	6.000
63,402 ft.	....	32,514	1014.754

Here the total rise is 1014.754 ft. and the time occupied in surmounting it was 25 minutes 6 seconds.

The weight of engine	138,000	pounds.
The weight of tender	65,000	" average.
The weight of train	253,000	"
Total weight	456,000	"

The work done in raising this weight through 1014.754 ft. is 462,726,000 foot-pounds, and assuming with M. Marié that the train resistance is $\frac{1}{232.5}$, we find a resistance of 1961.29 lbs. through a distance of 63,402 ft. This amount, 124,349,708 foot-pounds, added to the gravity resistance above found, gives the total work of the engine as 587,075,708 foot-pounds, or equivalent to 708.77 indicated horse-power for 25 minutes 6 seconds. The consumption of coal on this was 1,176 lbs., being equal to 1.6592 lbs. per horse-power, or 3.965 lbs. per horse-power per hour.

It will be observed from the above table that for nearly one-half the distance the road is curved. For this no additional resistance is figured, nor is any allowance made for priming, for which M. Marié allows as much as 9 per cent. In the Marié engine, taking the figures just as given in M. Marié's paper, the work done in 61 minutes was 770,600,000 foot-pounds, or 383 effective horse power. Comparing the

two engines, we find that for a total engine and tender weight of 203,000 lbs. the No. 444 engine gave off 709 horse-power, or 1 horse-power for 286 lbs. weight, while the Marié engine of 150,000 lbs. only gave 383 horse-power, being at the rate of 1 horse-power for 391 lbs. weight. The relative weight efficiency was thus as .731 to 1.000, No. 444 doing the greater work per pound weight. Now, the Marié engine was cutting off steam at ⅛ the stroke, but had it been required to work up to the higher efficiency a mean pressure of $\frac{730}{1000}$ greater would have been required. From the well-known formula:

$$p = P\,\frac{(1 + \text{hyp. log. } R)}{R}$$ we have for ⅛ cut off

$p = P\,\frac{(1 + 1.6)}{5}) = .52\ P.$ To increase this in the ratio $\frac{1000}{731}$ we require $p = \frac{520\ P}{731} = .712\ P.$

The rate of expansion corresponding to $\frac{(1 + \text{hyp. log. } R.)}{R}$ = .712 is 2.9 times, and the consumption of steam thus required would be $\frac{29}{20}$ of what was used at the lesser power. Marié gives the coal consumed at 3.27 per effective H. P.' and multiplying this by $\frac{29}{20}$ we get 5.64 lbs. of coal per horse power per hour, which would be required for the Marié engine working as efficiently per pound of weight as the Lehigh Valley engine. This is a big increase upon the Lehigh Valley consumption of 3.965, and d monstrates the superiority of the Strong engine most conclusively by M. Marié's own figures. Again, take the actual power developed by the two engines and we find the ratio 1.851. With the same formula $p = P\,\frac{(1 + \text{hyp. log. } R)}{R}$ we have the fraction .52 and .52 × 1.851 = .9625, which is equivalent to a cut-off of ¾ and an expansion of 1.33 and thus equal to a nearly fourfold consumption. Against this, of course, is to be set the fact that for the earlier cut off the back pressure in the Marié engine would be very great, and that as the link was lowered for the higher power, this back pressure would be reduced and an earlier cut off than ¾ would be feasible. This is so, but the fact is not sufficient to counterbalance our argument, though it points strongly to the conclusion that the valve gear of the No. 444 engine with its almost atmospheric and parallel back pressure line at all speeds is enormously superior to any link motion gear. As a fact, the coal consumption of 3.965 of the No. 444 engine was obtained with a cut off of about ⅛, so that $\frac{1 + \text{hyp. log. } R}{R}$ is in this case about .7. Hence with a fivefold expansion the consumption would fall to about $\frac{5}{7.6}$ of 3 965 = 2.94.

All the foregoing figures can only be taken as approximations, as no account is taken of back pressures in the absence of indicator diagrams for Marié's engines, but they are at least sufficient to show that the apparent economy of the Marié engine could not be sustained in actual work at high power.

Though Marié's own method has been used here, no stress can really be laid upon its accuracy, and the very fact that Marié uses so coarse a method of determining engine power, and then makes so fine a correction as is involved in allowing for the expansion of water in the boiler by heat, though he neglects the expansion of the boiler itself, is sufficient proof of his inability to really grasp the true facts of the question.

We may go further and compare the relative sizes of the two engines. The area of Marié's piston is 350 sq. in. as against 310 sq. in. of the No. 444. The area ratio is therefore 1.129 : 1.00. The stroke ratio is $\frac{24}{24}$, making the capacity ratio 1.223: 1.000. Hence per cylinder capacity the No. 444 engine was giving out actually 2.26 times the work demanded from the French locomotive, but the French engine had only 49⅝ in. wheels and the No. 444 drivers are 62 inches diameter, or 1¼ times as large. Comparing the two machines as a whole, this means simply that for work done at the rail the Marié engine with its large cylinder and smaller wheels should be capable of doing work 1.53 times that of the Lehigh engine per pound of effective steam pressure. That it did not do this is no proof that it could not, but is a sufficient explanation of the early cut-off which gave the economy of coal you note—an economy which a little figuring on Marié's own basis proves to be visionary, for, as I remarked above, no American road would tolerate the small train load and low speed at which Marié's tests were made. Actually, therefore, to be working as hard as the No. 444, the duty of the French locomotive should have been 1.084 h. p. in place of 383 which it actually was, or allowing for the lower boiler pressure, say 750. In other words, the Marié engine was just about half loaded as compared with No. 444. It is also worthy of note, that while the French engine only ran at a speed of 17.4 miles per hour, No. 444 made nearly 29 miles per hour.

M. Marié draws also a comparison with a Corliss engine, but this comparison has not the merit of consistency, for the power of the Corliss is measured from indicator cards, while it ought consistently to be taken from a brake on the fly-wheel.

The data given are very meagre, and it may be supposed that the piston speeds were quite different; that the boilers were of very different types and generally the mode of working and the losses by radiation so varied as to render a comparison valueless.

Of M. Regray's experiments which you refer to as corroborating, in a way, M. Marié's statements, all I know is that the indicators taking the diagrams from which the results were calculated were not on the engine, but on a special "van" back of the tender. The liability of error in such an arrangement would appear to be so great than I cannot consider the figures as at all conclusive.

With respect to the question which you raise concerning the apparently great amount of water used by engine No. 444 as compared with No. 383, which has the same style of valves and valve gear, I may say that there were several reasons therefor. First. The fireman of No. 444 had not become sufficiently expert to prevent the blowing off of steam at stations and while running down grade without steam. Secondly, No. 444 has steel valves, which have not worn well, and which leak slightly; whereas the valves on No. 383 are cast irons which have worn as smooth as glass and kept perfectly tight. Thirdly, the engineer of No. 444 had not become accustomed to the engine, and carried his water so high that priming occurred; and fourthly, the valve gear of No. 444 was designed after the engine was nearly completed; having to be arranged to accommodate existing parts, its proportion could not be kept as accurately as those of 383's gear. The steel valves of No. 444 will shortly be replaced by cast iron, and I expect to see a marked improvement in the working of the engine.

As to the indicator cards published. They were taken, as mentioned under them, on the Northern Pacific, at a speed of 60 miles per hour, from the right-hand cylinder of the engine, and were worked up and given to Mr. Leavitt by me, as high-speed cards, and cannot be regarded as being part of the Lehigh Valley test. Mr. Leavitt, as he mentions in his remarks on the tests, will shortly publish a supplementary report in which will be reproduced cards from the three engines tested, together with some from stationary engines, and a careful analysis of the same, showing the difference between the theoretically possible and the practically attainable. Whilst speaking of the Northern Pacific cards, it is worthy of note how very closely the train resistance of 31.2 lbs. per ton at 60 miles per hour, deduced from them, agrees with that given on the diagram of train resistance in Mr. A. M. Wellington's "Railway Location," and facing page 518 in that work; the difference between what it should have been and what it was being barely appreciable.

Respecting the weight of the No. 444, I can do no better than to give the reasons therefor. The engine was designed to accomplish very desirable and important ends; one of which was to produce a machine capable of taking over the mountains, alone and on time, trains usually pulled by two engines, in doing which, a grade of 68 ft. to the mile and 11 miles long, on the eastern slope has to be traversed in 20 minutes, the train consisting during the summer months of from 10 to 11 cars, two being parlor or chair cars; while when running in the opposite direction a 96 ft. grade 12 miles long is encountered, abounding in curves of short radius and which has to be surmounted with seven to eight cars in 24 minutes. The resistance due to these curves added to that due to the grade forms a total resistance equivalent to that experienced by a train running up a straight grade of 130 ft. to the mile. It is almost superfluous to remark that the great tractive force and consequent adhesive weight necessary to perform this work precluded the possibility of using only four drivers, and so six were used in connection with 20 in. × 24 in. cylinders and 160 to 170 lbs. of steam. The form of boiler used was adopted to carry the high pressure safely, and as I found that I could not carry the large boiler necessary to supply steam to the 20 in. cylinders when running at high speeds, without putting more weight than I thought desirable on the leading truck and drivers, I grouped the drivers close together, bringing the centre of gravity of the engine directly over the main axle, and put in a rear truck equalized with the drivers. The other end aimed at in the design was the production of a boiler capable of burning the low-grade anthracite and bituminous coals to be found in such quantities about the mines, and which have a very low monetary value. It goes without saying that an enormous saving in the fuel bill of a railroad company would result from the use of these screenings. In service the No. 444 has demonstrated that more than sufficient steam can be generated from this coal to meet all the requirements of fast and heavy passenger service, and I can, in good faith, assert that such a thing has never been accomplished by any other engine, although many have been built with the avowed purpose of doing so.

Finally, my valve gear, as will be readily understood, works to the best advantage in comparison with link motion when running with high pressures at high speeds, and naturally would not show up to its best advantage when working up heavy grades at comparatively slow speeds. This claim was made good in the run over the Pittsburgh, Fort Wayne & Chicago, which was commented on editorially, as being remarkable, in your issue of June 24 last.

GEO. S. STRONG.

[If we rightly understand Mr. Strong's comments regarding the experiments of Mr. Marié, the Strong locomotive, in his opinion, would have done better had it been tried by the same method; but he does not regard the method as reliable. He seems to prefer the method used in the test of his own locomotive, where the judgment of the experimenter took the place of an accurate measurement of the coal. He dismisses the corroborative evidence furnished by Mr. Regray's experiments, on the ground that the latter's method of test was also liable to error, because an electrical indicator, situated in the dynamometer car, was used instead of the ordinary instrument connected to the locomotive cylinder by a pipe. The relative accuracy of the two methods of using the indicator is a question which may be left out of consideration here. It would be useless to engage in a controversy about such matters, and we take pleasure in affording Mr. Strong space to express his views. Our criticisms, it will be remembered, were not directed against the Strong locomotive, which we regard very favorably, but against some of the methods and statements of the experimenters, for which we presume Mr. Strong is not responsible.—EDITOR RAILROAD GAZETTE]

Compound Tank Locomotive (Webb's Patent), London & Northwestern Railway.

The accompanying illustrations represent a class of engine used on the London & Northwestern for working suburban passenger trains, and also for working on branch lines having heavy grades and sharp curves. The engine is compounded on Mr. Webb's system, the two high-pressure cylinders working the rear drivers and being outside connected, while the single low-pressure cylinder is inside connected and works the main or forward driving axle. The axles are not coupled, and therefore coupling rods are dispensed with. As the Webb and other types of compound locomotives have been fully described and illustrated in previous issues of the *Gazette*, any detailed explanation of the principles of compounding is hardly necessary here.*

Some non-compound engines with similar arrangement of wheels, boiler tank, etc., have been running on the London & Northwestern for some years. When working the same suburban passenger trains the compound engines burnt 23.3 lbs. per mile, against 32.1 lbs consumed by the similar, but non-compound engines. The economy is very remarkable and is greater than that shown by main line engines. In suburban traffic, the greatest part of the coal is burnt when the engine is getting away with the train, and consequently is working in full gear or nearly so. With an ordinary locomotive, the amount of expansion is then very limited. If the cut-off takes place at 20 in. of the stroke, the expansion, allowing for clearance and premature release, can only be about 1.1 fold. The amount of steam consumed per indicated horse-power or per unit of work done is therefore considerable. The minimum amount of expansion, with the compound locomotive, is about threefold, and therefore even in starting a train the steam is being used under economical conditions. When this simple fact is borne in mind, the economy of the compound locomotive ceases to be a matter of surprise.

The valves are worked from the connecting rods by Joy's motion, but the Walschaert motion, actuated by one eccentric and the crosshead, could, of course, be used. The grade of expansion can be varied independently in the high and the low pressure cylinders, and the valve on the low pressure cylinder can be working in full gear when the high pressure valves are cutting off early in the stroke. This method of working permits a large opening for the admission and release of the large volume of steam passing through the single low pressure cylinder.

It will be observed that the engine, though of considerable weight, 114,000 lbs., is carried on only eight wheels, which are, of course, somewhat heavily loaded. The engine, however, is intended to run over strong permanent way which is quite capable of carrying 35,000 lbs. per axle. The arrangement of wheel base renders the engine capable of running either end foremost over any curves, the end carrying wheels being fitted with Webb's radial axle boxes—a very simple device, which, having no links or radius bar, takes up but little room. The side springs control the lateral motion, and, while permitting the wheels to radiate truly to a curve, steady the engine while running on a tangent

The weight of the engine may seem excessive for the amount of heating surface, etc., but the amount of water and coal carried is considerable. Assuming what is probably not far from the fact, that the tanks and coal bunkers, with the necessary fittings, brackets, etc., weigh as much as the water, the engine, if stripped of tanks and coal bunkers, would be lessened in weight about 33,000 lbs., and would then only weigh 81,000 lbs. This is not an excessive weight for an engine with 1,000 sq. ft. of heating surface, and exceedingly strongly proportioned, as will be seen from the drawing. The wearing surfaces are also ample throughout.

The engine is fitted with an arrangement for turning the exhaust steam into the tanks when the engine is running through tunnels. The arrangement is similar to that used on the underground railroads in London. When the water in the tanks is so heated that it cannot readily condense the exhaust steam, the surplus steam escapes by the small escape-pipe, shown at the rear end of the coal bunker.

The leading dimensions of the engine are as follows :

Cylinders.		
High pressure (2) diameter		14 in.
" " stroke		18 in
Low pressure (1) diameter		26 in.
" stroke		24 in.
Ratio of cylinders		1 : 2.3
Tractive power per lb. average pressure, referred to low pressure cylinder		150 lbs.
Boiler.		
Working pressure		160 lbs
Barrel, length	10 ft. 1	in
" mean diameter outside	3 " 11⅝	"
Length between tube plates	10 " 4⅜	"
Inside fire-box (copper), length	4 " 2	"
" " " width	3 " 4	"
" " " depth	5 " 7⅛	"
Tubes, external diameter	1⅞	"
" number	179	
Heating surface		
Tubes	908.87 sq	ft
Fire-box	84.84 "	"
Total	993.71 sq.	ft.
Grate area	14.24 "	"
Capacity of tanks, American gallons	1,740	
" " " Imperial gallons	1,450	

* Those interested in the subject will find some useful information in the enlarged edition of *Recent Locomotives*, recently published.

Wheel base.

Leading to low pressure driving	7 ft.	1 in.
L. p. driving to high pressure driving	7 "	9 "
H. p. driving to trailing	6 "	5 "
Total	21 ft.	3 in.

Weight.

Leading	26,200 lbs.
L. p. driving	34,700 "
H. p. "	35,000 "
Trailing	18,000 "
Total	113,900 lbs.

Engines of this type have been so successful that Mr. Webb has gone a step further and built some compound tank engines for working main line freight trains. These engines have six driving wheels, the high pressure cylinders working on the four rear drivers, which are coupled. The low pressure cylinder is connected to the front drivers which are not coupled to the other wheels.

The 18th Annual Convention of the Master Car and Locomotive Painters' Association.

SECOND DAY.

The attendance upon the convention's second session was small, but the proceedings were of unusual value and interest. Though one-third of the active members were represented by empty chairs, the remaining seats were, in several senses, well filled.

Order was called at 10:30 a. m., and committees asked to present their reports, but, except from one member of the four standing committees, nothing substantial was obtained. The hard-working secretary of the Association reported that as one of the important Committee on Information, he had supplied such information about methods of work, and given such advice as he could to those members who had written to him during the year.

The new committees were then announced—the Committee on Information (advice to those needing practical aid) consisting of Robt. McKeon, Kent, Ohio; F. M. Widser, New York Lake Erie & Western; B. B. Hodges, Wilmington, Columbia & Augusta; and Mr. W. C. Fitch, of the Southern Pacific. It is the duty of these gentlemen to reply to letters of inquiry.

The first paper of the day, by Mr. Alex. Campbell, of the Manhattan Elevated Railroad, attracted much attention, and a guide to order our japans from the manufacturers with a greater degree of confidence than we have in the past.

Appendix.

Coach japans used by Manhattan Railway, tests of time for drying; prepared by Alex. Campbell:

JAPAN NO. 1.

Parts oil to 1 of japan.	Time.	Parts oil to 1 of japan.	Time.
2	1:35	12	4:55
3	2:00	13	5:15
4	2:30	14	5:40
5	3:00	15	6:15
6	3:30	16	7:00
7	3:45	17	7:40
8	4:00	18	8:30
9	4:15	19	9:00
10	4:25	20	9:30
11	4:40		

JAPAN NO. 2.

Parts oil to 1 of japan.	Time.	Parts oil to 1 of japan.	Time.
2	1:48	12	2:00
3	2:15	13	2:15
4	2:30	14	2:30
5	2:00	15	2:30
6	2:00	16	2:50
7	2:00	17	3:15
8	2:00	18	3:45
9	2:00	19	4:00
10	2:00	20	4:15
11	2:00		

JAPAN NO. 3.

Parts oil to 1 of japan.	Time.	Parts oil to 1 of japan.	Time.
2	2:00	12	2:00
3	2:15	13	2:05
4	2:30	14	2:15
5	2:15	15	2:25
6	2:00	16	2:40
7	2:00	17	3:00
8	2:00	18	3:20
9	2:00	19	3:40
10	2:00	20	4:05
11	2:00		

JAPAN NO. 4.

Parts oil to 1 of japan.	Time.	Parts oil to 1 of japan.	Time.
2		12	2:15
3		13	2:20
4	3:45	14	2:25
5	3:35	15	2:40
6	3:25	16	3:00
7	3:20	17	3:15
8	3:15	18	3:30
9	3:00	19	3:45
10	2:35	20	4.00
11	2:15		

QUANTITY OF PAINT PER SQUARE YARD.

What quantity of oil paint, composed of metallic paint, linseed oil and japan, should constitute a good coat to the square yard of surface?

The question which has fallen to my lot to answer, appears at first sight to be so trivial as to scarcely require more than the single reply of, Just enough, or as much as any good workman having a proper knowledge and experience would apply. But just there, I find, is the point of the question; how many such practical workmen agree as to the quantity of paint constituting a good coat? I venture to assert that very few so agree, and for the reason that the subject in question is entirely governed by the conditions under which the painting is done, by considerations of economy and by individual requirements.

First, as to the conditions under which the painting is done. In a well appointed shop, properly heated and ventilated, one can supply the paint with greater facility, spread it more uniformly and cover his work with a less number of pounds of paint than one who paints his freight cars in the open air, with the thermometer at zero, and yet both may fairly claim to have applied a good coat of paint.

Secondly, as to the considerations of economy. Given the same conditions as to shop room and facilities, the one painter is doing contract work and must practice the strictest economy in the interest of his employer in saving on the cost of the job, while the other is in the employ of the railroad company, and his views of economy differ from the first, in that he knows that, if the cars are not well protected by the paint, they will not make a good record and he will have them back on his hands to repaint, and some explanation will also be required of him as to why they are not thus, and it is a matter of economy to him to use more paint to obtain longer service supposing, in both cases, the specifications to require a like number of coats.

Thirdly. By individual requirements or, more properly, exigencies, freight cars vary in the finish given to the siding as the practice varies in the different shops in which they are built. If the siding is uniformly smooth and free from knots and inequalities, well dressed and sandpapered, less paint is required to constitute a good coat than if the siding is of inferior lumber, full of sap, badly dressed, torn up with dull bits, and no sandpaper used to smooth off the surface. A good coat on such a surface would take twice as much paint as in the first case; yet both painters would claim to have applied a good coat and would probably, if the question was raised between them, charge the one with useless waste of material, while the other would retort with a skimping of material on the part of the first, neither knowing the conditions under which the painting was done or the requirements of each other. We have, then, certain requirements other than the mere application of the paint governing the minimum quantity constituting a good coat. These are:

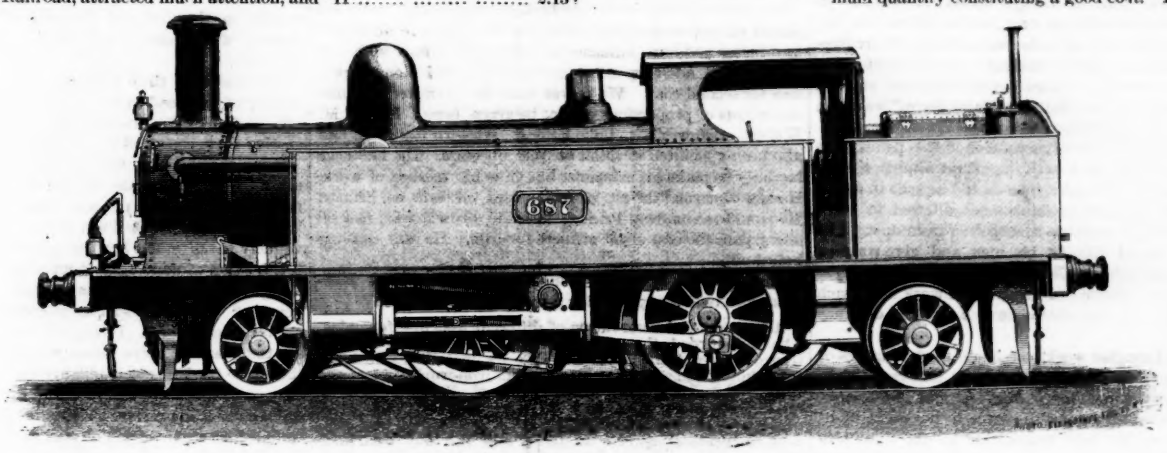
1. Proper facilities for doing the work.
2. Suitable temperature in shop.
3. Well finished woodwork.
4. Due consideration for length of service or durability.

Under such conditions 5⅝ oz. of oil paint, composed of metallic paint or red oxide of iron, linseed oil and japan dryer, weighing when mixed 11 lbs. to the gallon, will constitute a good coat of paint to the square yard of surface for the priming coat, and 3⅛ oz. of the same to the square yard of surface for the second coat. Or, taking for example a 34-ft. box car, which contains 115 square yards of surface, including the roof, it will require 40 lbs. 5 oz. of paint for the priming coat and 25 lbs. 15 oz. for the second coat; or for the two coats 6 gallons of mixed paint to make a satisfactory and durable job, and this notwithstanding the absurd claims that are made by some manufacturers for the various pigments (of like character with the metallic paint under consideration) of the wonderful spreading and covering qualities of each, over a given amount of surface, of one or more gallons. We all know that the oil is the vehicle by which the pigment is spread, and that the addition of pigment will not increase the spreading power of the vehicle; but of two mixtures of oil and pigment, each ground perfectly fine, no matter what pigment is used, they will spread over an equal amount of surface, although they will not cover equally well if one has more capacity than the other.

Mr. M. L. Sims, of East Tennessee, Virginia & Georgia Railroad, followed with a paper upon the same subject.

On the same topic the following paper was presented by Mr. Milton L. Sims, Master Car Painter Georgia Division East Tennessee, Virginia & Georgia Railroad.

The subject for consideration is one which at first seems to require very little thought, but when we begin to look into it more closely we find that it is of much more importance than at first supposed. We are met at the outset with a vast number of metallic paints, some of which have good drying qualities, while others have none. It would therefore be almost, or quite, impossible to give a formula that would meet all the demands of the times. Then, again, the different seasons and climates would have to be provided for. In doing this we must not lose sight of three essential points in the painting of railroad freight equipment, viz.: economy, durability and the shortest possible time. How to combine these points in one is what we must endeavor to do, and if we succeed in showing any improvement over the usual method of mixing and applying oil paints it will be a step forward in our branch of the trade. At the same time, it is not expected, or do we believe, that every one will think as we do, without making a practical test. We will there-



Compound Locomotive for Suburban Traffic, Webb's System. London & Northwestern Railway.

is here given in full. Its value was recognized in the numerous questions and remarks which it called out.

DRYING AND BINDING QUALITIES OF JAPANS.

It is generally admitted that scarcely two samples of japan of different manufacture will give like results as to drying and binding qualities. Why should there be such a variation, and can we not have a standard of specifications as to drying and binding? In what way shall such a standard for japan be determined?

Having been assigned the above subject, I am forced to say at the outset that often and often have I been like a mariner at sea without rudder or compass, by and through the action of japan, in my mixed paints; and I do, therefore, most heartily fall in with the proposition set forth by our worthy President and Advisory Committee as being most opportune.

As it has been kindly suggested, I have endeavored to make some tests, as to the drying qualities of four japans, which are almost in constant use by our company. Not wishing to occupy too much valuable time, I will proceed to give my findings in brief, in a temperature of 120°.

For convenience I have classified the japans under numbers.

The first test with number one japan, two parts oil to one part japan, consumed one hour and thirty-five minutes in drying. The last, or twenty parts oil to one part of this same japan, to dry consumed 9½ hours. I think I have secured a fine average in the following tests of our number one japan: seven, eight, nine and ten parts oil to one part japan have almost tallied the same time, four hours in drying.

In the tests made with our number two and three japans the results in time for drying were almost alike; beginning with two parts oil to one of japan, consumed two hours and twenty minutes; and 20 parts oil to one of japan, to dry consumed four hours.

Number four japan: In the test of this article I met with a genuine surprise in the two, and three parts oil to one of japan. I found that in the process of drying the respective liquids disunited, and they, like many of the human family, would have neither lot or part in the solution of the problem, to make life more cheerful. In the four parts oil to one part of this same japan, the time for drying was three hours and forty-five minutes. From this to the twelfth part oil test the time gradually lessened to two hours and fifteen minutes, and then increased proportionately to the 20 part oil test, which consumed four hours.

Appended to this paper is a record of the various tests I have made, and it will afford me no little pleasure to pass the same to our honorable secretary, so those who wish may examine the same.

I will close with saying it is my earnest wish to see, ere this body adjourns *sine die*, a formula adopted, so we may have

DISCUSSION.

Mr. Fitch asked why a temperature of 120° had been hosen for the experiments. Such a temperature would hardly be found in any shop, unless it might be in Arizona.

Mr. Stines replied that he supposed Mr. Campbell had chosen 120° because he wished to finish his experiments in one day, without sitting up all night. There seemed, however, to be such a discrepancy between the results, that the fact must be considered established that all japans are not alike in value. Comparing No. 1 with No. 2, we find that with the former, the time of drying increases as the proportion of oil is increased, while with the latter, the time of drying decreases with an increased proportion of oil, until we reach the proportion 1 to 12. But we do not know what was the composition of the japans. If we knew we might arrive at a definite and exact standard.

Which of the japans did Mr. Campbell consider the best? If japan No. 2 is a perfectly safe one, its use would economize time and material.

Mr. Campbell replied that he considered No. 1 the poorest, Nos. 2, 3 and 4 very good; No. 4 as perhaps the best. There was but little difference in the prices of the japans. It was the custom of their shop to buy the "best." "They did not always get it." The experiments were made on a glass surface, and subject to steam heat.

Mr. McKeon called attention of members to the importance and ability of Mr. Campbell's paper, and hoped it would be carefully studied. Mr. Stines asked for a second reading of the table appended to it, and then pointed out the value of japan No. 4 as compared with No. 1. It required but one part of japan No. 4 to dry 20 parts of oil in four hours, one part of japan No. 1 drying only 8 parts of oil in that time. But japan No. 4 did not act so well in a large proportion as in a smaller one, and this was in accord with experience with good japans.

Mr. Campbell agreed with Mr. Stines that japan No. 4 was the best, although it did not, when in large proportion, unite well with the oil.

At the request of President, the Secretary read the following paper by Mr. F. S. Ball, of the Pennsylvania Railroad (Altoona shops).

fore proceed at once to the subject and ascertain what constitutes a reliable metallic and oil paint.

First. It should possess good covering qualities, spread well under the brush and dry within a given time, and when dry be less elastic than the color which is used for lettering, etc. This cannot be obtained when boiled linseed oil is used exclusively in mixing the ground or body coats. This evil we will have to remedy, or else we will continue to see all our stencil work, where white lead is used, crack prematurely. How, then, shall we mix our metallic paint in order to obtain the best possible results is what we will here endeavor to show, using the following formula for the liquid :

	Per cent.
Pure boiled linseed oil	65
Pure raw linseed oil	20
Spirits of turpentine	5
Good coach japan	10

Mixing 8 lbs. of dry metallic paint to each gallon of the above, which will give us a mixed paint that will weigh 12 lbs. to the gallon, and cover with one coat 32 square yards of new beaded surface. Reducing this to one square yard, we find that it will take 6 oz., or one gill, for the first coat. For the second coat 4 oz. or two-thirds of a gill per yard, the third coat being in about the same proportion as the second. Old painted surfaces will require more and vary according to the condition of the surface to be painted. The above estimates will be found as nearly correct as accurate weighing, measuring and careful applying will allow. The addition of raw linseed oil and turpentine makes a more durable paint, which will dry without the heavy tack found so objectionable in paints where boiled oil is used exclusively.

Mr. McKeon called attention to Mr. Ball's figures. Thirty pounds was certainly sufficient for an entire freight car—or at most 40. He thought there must be some error here. His remarks were followed by a valuable but rather eccentric discussion by a variety of members upon a variety of topics, specially boiled oil. One gentleman, not an active member, explained his strong objections to boiled oil on theoretical grounds, stating that the water evaporated from it returned within a few days; that a boiled oil was a thin japan, as oil is never boiled without addition of driers. It had the tendency to skin over and not dry through. Raw oil would dry nearly as quickly even in damp weather—why then was boiled oil used ?

A new member followed with a story illustrating the many years required to learn that boiled oil was a humbug.

These sentiments did not seem to meet with favor. One member explained that he always added turpentine to boiled oil to prevent its skinning over, but no defense of the article was attempted, because the remarks made were irregular and not called for by the subject. An excellent paper by E. L. Bigelow, of the Baltimore & Ohio Railroad, entitled "The Management of the Railway Paint Shop," was then read by the Secretary at the request of the President.

Mr. Bigelow regarded the entire control of the paint shop by the master painter as a very important condition of its proper management. The paint shop should be true to name, and carpenters, tinmen and machinists not allowed to work there. Good painting requires a shop free from dust. The master painter should classify his men, and give rougher work to the cheaper hands. Cleaners and rubbers need not be skilled workmen; outside and inside coach work needs each its own men. Every shop should have a skillful designer and letterer.

The cleaners and rougher workmen should work in gangs of four. Piece work is gaining ground in our railway shops. It gives new life to the men, more work is done in less time, and in the experience of the writer there is no slighting of the work when men are held responsible to the extent of being obliged to make good any piece of poor work. It is better for the hands, since they earn more money in less time. There should be a stock room, in charge of a keeper, and it should be a closed room to all other employés. This precaution, rigidly enforced, will do away with many "devilties" of paint and varnish, which are sure to occur if men are allowed to help themselves to material as they need it. The master painter should control the purchase of material. His judgment will be found to accord with the results of the chemist's examination, and therefore a chemist is not necessary. The master painter has gained his experience by long years of familiar acquaintance, and this experience and his reputation are his capital. Therefore he has no temptation to buy poor stock.

The reading of Mr. Bigelow's paper was followed by a brief account of a new system of shop management, introduced by E. L. Fetting, of the New York & New England Railroad. Mr. Fetting stated that he had been opposed to time keepers and their visits through the shop. They often failed to get the correct time, and the men as well as the road suffered. It was a perplexing thing to have a hand come to the master painter with a complaint that the man's time had not been properly charged, and he had thereby lost wages. He had therefore devised a system by which each hand kept his own time, on a time-card, having printed items against which the distribution of time was charged. By these cards the master painter could at once discover just where work had been placed, and could make up the cost of any job. A ledger account is kept with every coach by the assistance of these time cards.

The men are classified into two grades. This avoids disputes about wages and increase of pay. The highest wages are given to ornamenters and stripers.

The time-sheet system has been extended to the traveling (road) painters, who are obliged to send in a card every day. There is an oil house in connection with the shop, having a capacity of 10,000 gallons, and oil is delivered only upon an order.

At the conclusion of Mr. Fetting's remarks, a Western member asked what one should do whose men could not keep time? Mr. Fetting's system looks very well on paper, but in the West men are not to be dealt with in that fashion. What would he do, for example, with 100 Swedes who did not know the English language?

Mr. Fetting replied that he thought there were in these days few workmen who were not able to look after their own time, and to keep a pretty close watch upon it. The men work in pairs and can take care of themselves.

Mr. Campbell followed Mr. Fetting and said he had used the time-card system in his shop, but thought it was partly bad as well as partly good. It gave a nice excuse to wash up early. The time was often omitted, and if men in consequence lost wages, a row was kicked up about it. The system was a curse to the shop foreman.

Mr. Fetting replied that he had found no such difficulty. There was a box for the time-cards which was not opened for their reception until 5:55 p. m., so that no man could drop in his time, and then spend it in washing up.

A motion here made to close the debate was opposed by Mr. Fitch of the Southern Pacific. He said this was an important subject, and he had come from a long distance to obtain information. In his portion of the country, it was seldom that men could meet and discuss such questions. He had used the time-card for many years and it worked well, but he wanted more information about shop management. What, for example, did members do about keeping brushes?

Mr. Fetting replied that he had previously placed them in charge of a storekeeper, but this did not work well. Each man now keeps his brushes and other tools and is held responsible for them.

A new member returned to the subject of time-cards. He had known of cases when, by agreement, men had taken care of their friends' cards, the latter being absent or late.

Mr. Fetting replied that this could not be done in his shop, as each man received his card from the time-clerk, who knew him personally. His system was one of time-cards, not of mere checks.

PRIMING COAT FOR LOCOMOTIVES AND TANKS.

A paper was read by Mr. Jno. S. Atwater, of the Hinckley Locomotive Works, discussed the question : "What constitutes the best priming coat for locomotives and tanks?" Mr. Atwater had been much interested in this question, and had made many experiments, but these were not yet sufficently complete to bring forward in proof of his views. He was of opinion, however, that nothing equaled Prince's metallic and oil as a primer.

The priming coat is for protection; ornamental coats are placed for appearance, and need less oil. Time is an important factor and must influence method. Mix primer with one-half raw oil, add turpentine and japan. Add more turpentine for second coat. We regret that Mr. Atwater's definite statements of proportions cannot be given here. Mr. F. M. Widser, of New York, Lake Erie & Western Railroad, had also been appointed to speak on this question. He had been too busy to make experiments, but gave his method of work. He had discarded the use of white lead on iron as primer. He would recommend Prince's metallic brown, with raw oil and japan, the best of all primers for iron. He did not use boiled oil.

Mr. C. C. Wood, of the Pennsylvania & New York Railroad, also read a paper on the same subject.

After a careful observation of different tests and formulas, I have discarded the use of white lead entirely for locomotive and car painting, and use Prince's metallic exclusively for priming and second coating on all iron-work on locomotives. I make a thick paste paint of Prince's metallic of the following formula : 2 parts rubbing varnish, 1 part prepared raw linseed oil, 1 part coach japan, and thin with turpentine; spread on freely and rub out well, and, when possible, let dry for twenty-four hours; then sandpaper thoroughly and apply the second coat of the same formula, and in ordinary weather will dry sufficiently to putty all rough and uneven places in five or six hours. For new cabs and tanks I use Prince's metallic and prepaired raw linseed oil alone, giving the work three or four days' time before sand papering. For old work, that the paint has been burnt off, I make a paste of Prince's metallic, of three parts oil, two parts rubbing varnish, one part japan and thin with turpentine. The prepared oil is raw linseed oil boiled over a slow and moderate fire for two or three hours to evaporate the water that is in the oil. I have used oil prepared this way for years and with good success.

Mr. Wood's brief paper led to many remarks. He was asked if he had tried his method on steel, and replied that he had. He used, however, less oil wherever the paint was placed near the fire. He cleaned his tanks before painting with oil, not water, rubbing them down with sandstone, and coating them with raw oil until ready to prime.

A new member gave his method as that of slaking lime, then adding potash to the lime water, coating the tank with the paste so formed and then scraping it.

Mr. McKeon remarked that while many years ago the only method of painting iron was coating it with white lead, we had come to discard lead in form of Prince's metallic, and the agreement was almost universal.

Mr. Wood said he had discarded lead wherever varnish must be placed over it, for he believed it tended to crack the varnish. This was his method on wood and iron—he did not use it for ground where varnish must be placed over it.

Mr. Wills thought the best primer was pure linseed oil.

A new member described his method of dealing with tanks. He scours them with sandstone until as clean as a new knife, washes them with a mixture of one-half oil, one-half benzine, and rubs the surface dry. Then he proceeds by a method exactly opposite to that one recommended by previous speakers; he primes with one-third lead and two-thirds lampblack ground in linseed oil.

Mr. Wills bore testimony to the durability of boiled oil and lampblack. In his experience it not only would not scale, but must be burned off, as it would not be scraped off.

A member from the Southwest rose to the defense of white lead. Their cars were exposed to a very hot sun, which burns the paint and drives in the oil. He had noticed, however, that the letters in white lead withstand the sun perfectly, while the colors about them would be burned off. As to cleaning steel tanks, he believed that nothing but sand stone and elbow grease would accomplish it.

Mr. Fetting disputed this and advised the use of kerosene, rubbing the tanks dry with rags.

A Western member found fault with all these methods as not economical of time or labor. A painter was restricted in his use of both. He had found that the use of sand-paper, followed by a coating of raw linseed oil, gave good results.

The discussion then wandered from the subject and became of little importance, and the Convention soon adjourned to the following day.

New England Railroad Club.

The club held its first meeting after the summer vacation at the Quincy House, Boston, on the evening of Sept. 14. The meeting took the form of a dinner, which is a new departure for this club. President J. N. Lauder presided, and among other gentlemen present were ex-Governor Smyth, of New Hampshire, President of the Concord Railroad; F. D. Adams, Boston & Albany; J. W. Marden, Fitchburg; J. A. Coleman, of Providence; Geo. H. Richards, Boston & Providence; A. A. Jackson, General Superintendent New York & New England; R. C. Blackall, Delaware & Hudson Canal Co.; J. B. Brady, of New York; Everard Holmes, General Passenger Agent Providence, Warren & Bristol; Isaac N. Marshall, Old Colony; Geo. S. Morrill, Old Colony; M. N. Forney; L. B. Bidwell, New York & New England; H. A. Phillips and J. F. Adams, Fitchburg. The attendance numbered 140, and included several ladies.

After the good things provided had been amply discussed, President Lauder called the assemblage to order, and spoke as follows :

I am very much gratified that we have had such a successful beginning of our first meeting for the season. I think if you go on from now until next June as you have begun you will accomplish something the coming year. Certainly I never saw so large a turn-out at any of our club meetings as we have to-night, and I have never seen such solid work put in, and I hope you will continue to put in that kind of work in the future. Mr. Coleman will give us a talk on the Rise and Progress of Railroads, and the Influence of Mechanical and other Organizations on their Progress.

Mr. Coleman then gave an interesting résumé of the history of railroad science and art, from Stephenson's time and earlier to the present day, concluding with some suggestive facts concerning car construction. He continued :

It is the purpose of your meetings to deal with these questions. Associations like this are a sort of tumbling barrel into which we are all put and jostled together until we get brightened and polished up. Things which otherwise lurk vaguely in our minds here get put into a tangible shape, by this friction of mind against mind, and we get new ideas of things that would never have come to us by studying at home. * * * Don't let us be everlastingly harping on this matter of cheapness. Cheap materials or cheap mechanics are the most expensive things a road can have. The roads that have the best mechanics are the cheapest roads, though they cost most at first ; roads that are cheapest in first cost are the most expensive. There is no such thing, with the tremendous traffic ahead of you, as doing business cheaply in the old-fashioned sense, with cheap material and inferior workmanship.

After a recitation by Miss Addie E. Noyes, ex-Gov. Smyth of New Hampshire, spoke congratulating the club on its usefulness and enterprise.

Mr. A. A. Jackson referred to the necessity of every one taking pride in his calling. Whether one is a freight brakeman or a master mechanic, he must have it, if he is going to succeed. I have never been prouder of my profession than when I have met representative railroad men anywhere. I hope this association will include in its membership all departments of the railroad business,—the accounting department, the machinery department, the transportation department and the track department.

Mr. George H. Coney made fitting remarks complimentary to the ladies, of whom several were present.

The President : The suggestion made by Mr. Jackson that the scope of this organization ought to be extended is a very excellent one. It should be made what it purports to be, a railroad club; not a master mechanics' club, not a master car builders' club, not an engineers' club, but a railroad club. I hope to see the time when this club will contain superintendents, auditors, general freight agents, general passenger agents, and representatives of the engineering department. Imagine what interesting meetings we could have if all of these departments were embraced in this organization.

Mr. Joseph A. Shinn, Auditor New York & New England, made some humorous remarks concerning couplers, and continued :

The auditing department of a road does not present many questions for discussion. It is based on figures, and they have the reputation, like George Washington, of not being able to lie ; but I presume some of my newspaper friends would say that they have seen something like untruths stated by columns of figures. The auditing department has been looked upon by many practical railroad men as a sort of stumbling block; and they often say they could figure out balance sheets more satisfactorily if it were not for the auditing department, which will insist upon having the facts represented, and not allow to go into construction account matters which should go into running expense account, for instance; and so this department has come into disrepute among the other branches of the service. But these different departments touch elbows, as it were, in their business, they

are each interdependent upon the other, and they will each admit in public that each department contributes something to the success of its neighbors; in private I don't know what they might say. The auditing department has never been looked upon as one which contributes anything to the earning power of the railroad; but the president and directors find that it is a very good place to get information from as to various details; and I think there is something of necessity about it, and if it were more generally recognized and more use made of the information it can furnish, the results would be somewhat better.

The President, in introducing Mr. M. N. Forney, said "he has started a journal which is going to overtop that paper (the *Railroad Gazette*) the *Railroad and Engineering Journal*.

Mr. Forney: * * * You have said something about newspaper matters, and what is going to be done in the future. It is a very dangerous thing to undertake to prophesy on those particular lines; it is better to wait the fulfillment. And I am glad that I can take a subject which is one of fulfillment rather than of promise—and that is the New England Railroad Club.

You have been engaged in your work for many years, and have made many suggestions; and when difficult questions of practical railroad management have come before you, you have had this one comfort and resource, in the midst of perplexities that seemed unsolvable, all you had to do was to refer them to the members of the railroad press, and we were always prepared to solve them entirely in the most satisfactory way. There has never been an accident happen in New England when the railroad newspaper men were not prepared to tell you how it would have been prevented if they had had their way. Therefore in taking to yourself the gratification for what you have done in your particular line, you ought to spare a small portion of gratitude for the members of the newspaper press, and particularly the railroad press.

Mr. E. N. Lewis, of the *Master Mechanic:* I wish I were able to do justice to your invitation and the fellowship which has been exhibited here to the members of the railroad press. You railroad men are engaged in fighting two great giants, Time and Space. The railroad is, take it all in all, the one great factor in modern life, and for a hundred years to come mankind will be struggling to live up to the railroad; the railroad has set a standard that it will take a generation for men to come up to. The legislature has been spoken of, I think the reason why there is such an instinctive opposition exhibited to railroads in so much of the legislation of the country, so much interference, which would not be tolerated against anything but a railroad, is because our civilization has not come up to the railroad standard. * * *

On motion of Mr. Adams it was voted that the subject for discussion at the next monthly meeting should be The Heating of Cars, and Legislation upon that Subject.

The Western Railway Club.

The first regular meeting of the club after the summer vacation was held in Chicago Sept. 21.

Contract Work in Railroad Shops and The Type of Car Coupler Recommended by the Master Car-Builders' Association were the topics considered.

Mr. F. D. Casanave, of the Pennsylvania Company, Fort Wayne, opened the former subject with a paper, wherein he showed, not only that the piece-work plan was practical, as had been shown by long experience in the shops of which he had charge, but with proper management more work could be obtained for the same wages than by the time system, while at the same time the hands were equally well, if not better, satisfied. His list of prices paid under the contract system covered almost every contingency which could arise, even in repair work, although occasionally there was an instance where time work was necessary. Tue address was a résumé of articles written by Mr. Casanave for the *Railroad Gazette* last year. In conclusion the speaker advocated the adoption of the contract system in all shops, estimating the saving thereby at 33 per cent.

In a general discussion which followed, Mr. W. H. Lewis, Division Master Mechanic of the New York, Chicago & St. Louis, corroborated the estimate of saving. Mr. B. K. Verbryck, of the Rock Island, thought it would require a great deal of additional clerical work to keep track of the piece-work, thus offsetting the advantages. Mr. John McKenzie, Superintendent of Motive Power New York, Chicago & St. Louis, thought the men would require more rigid inspection than on the time plan. Mr. Casanave explained that under the new system each man watched his predecessor, and that there was no noticeable shirking. Mr. Forsythe, of the Chicago, Burlington & Quincy, said that experience at the Aurora shops confirmed Mr. Casanave's estimate of a 33 per cent. saving with an equally good quality of work. Samuel Pullman, Chicago, Rock Island & Pacific, inclined to think a distinction should be made between the capabilities of men and quality of work. W. S. Wanston, Pittsburgh, Cincinnati & St. Louis, said he had been trying to introduce piece-work in his shop, because he believed that if once inaugurated, it was bound to show great economy. Mr. Sawyer, Chicago & Northwestern, was in favor of contract work, but foresaw many difficulties and feared discontent among employés. Mr. Casanave said that experience had refuted his apprehensions in this respect.

COUPLERS.

Mr. G. W. Rhodes, Chicago, Burlington & Quincy, reviewed the coupler situation, going back to the resolutions of the Saratoga Convention of 1884. He and his road had already voted for the Master Car-Builders' recommendation, with the knowledge that the "Janney type" included several devices and was not necessarily confined to any one make. The question of strength of couplers was yet to be tested. He predicted the use of the new style of coupler on passenger cars after freight equipment had been brought up to standard. The Miller, he said, was weak in that it was liable to uncouple on curves, and the Cowell freight coupler would not couple with the Miller, though such a claim had been made in advertisements.

Messrs. Mackenzie, Verbryck, Wadsworth, W. A. Smith and W. V. Perry took part in the discussion.

On motion, Chairman Verbryck appointed a committee of three to nominate officers, consisting of Messrs. Charles F. Pierce, Samuel Pullman and William Forsyth.

The following officers were chosen in accordance with the committee's report: President, G. W. Rhodes; Vice-President, B. K. Verbryck; Treasurer, W. B. Snow; Secretary, Angus Sinclair.

Watch Inspection on the Chicago, St. Louis & Pittsburgh.

This road, which took up this matter a year ago, has had a very satisfactory experience with it, and the following is a brief account, given by an officer of the road, of the action taken by the officers, in consultation with three experts selected from among local watchmakers.

"One of the first, in fact the principal subject to be considered, was the amount of variation to be allowed, for it was conceded that a perfect time piece was out of the reach of the men, even if obtainable at all. In deciding upon this the price of movements was taken into account, and it being found that one which would probably not vary more than thirty seconds per week could be purchased for from $30 to $50, it was concluded that there was no objection to that restriction so far as the cost was concerned, and as all men have access to standard clocks, set daily, it was deemed that so much variation could be allowed with safety, and that figure was fixed as the standard. The frequency of the examinations, quarterly, was decided upon because of the experience of the three watchmakers, which had been that, especially in the case of engineers, watches often got dirty and unreliable in that time. The method of examination is to appoint, as inspector, some resident and reliable watchmaker, at each point which is the end of a run; these inspectors to examine and report upon all watches taken to them with a request from the superintendent to do so. At the superintendent's office is kept a record of the watch carried by each man, and as often as necessary he is sent to one of the watchmakers with a certificate to be filled out. The road pays for all examinations, except in cases where a watch is found by the examiner to need cleaning or repairing, in which event the employé is obliged to provide himself with another movement (termed "borrowed watch"), to use while his own watch is undergoing repairs, and for this examination of a temporary movement the company does not pay, but the fee is assessed by the inspector against the employé.

The company has not gone into the details of watch construction at all, either as to adjustment, jewels, magnetic shields, or otherwise, leaving it entirely with the watchmakers to decide in each case whether or not the variation will probably be within the limit; but I believe that nothing bas been accepted not full jeweled, and adjusted to temperature and position. All road and yard conductors, engineers and flagmen (rear brakemen), are required to carry watches of the standard.

Since the examinations have been inaugurated, some of the American movements have been reduced in price, so that now a movement can be purchased for twenty to twenty-five dollars. Before the system was inaugurated it was looked upon with some distrust by the men, but when they found that there were conductors and engineers running against them who carried three dollar movements purchased from tramps, they discovered that its provisions were for their own safety, and they are now its warm advocates. I have frequently seen six to nine watches compared which would not show a difference of ten seconds between the fastest and slowest; and a watch thirty seconds fast or slow is hard to find.

Relative Economy of Metal and Wood for Railroad Superstructure in Austria.

In an article in the German *Organ*, Herr Hohenegger ascertains the relative expense of wood and metal as a support for rails by comparing the statistics of the guaranteed Austrian railroad system—almost entirely laid with wooden cross ties—with those of the principal line of the supplementary system which is largely on longitudinal iron or steel sleepers. He finds the cost of maintenance of superstructure per mile per annum as follows:

	On the Guaranteed System with oak ties.	On the Supplementary System on (24 per cent. on metal sleepers).
Total cost	$299.75	$200.86
Of which wages are	25.8 per cent.	45 per cent.
Iron and steel are	22.0 "	37 "
Wood is	52.2 "	18 "
	100.0	100.0

In spite, therefore, of the greater cost of labor in maintaining track on the iron longitudinal sleepers, amounting to about 13 per cent. additional, the total cost of maintenance of the supplementary system amounts to nearly 33 per cent., less per unit than that which is exclusively on oak ties. The saving would therefore presumably be very much larger were the supplementary system all laid on metal sleepers.

Herr Hohenegger is a strong believer in longitudinal bearings, holding up strongly to view their value in keeping track in line; but one cannot but think that the wages account for his metal supported track would have made a better showing if cross ties, with their greater bearing in the ballast and more favorable position for resisting unequal rail settlements, had been used. He states that in the 10 years during which these longitudinal sleepers have been in use there has never been a broken rail in the track carried by them.

A most original argument is advanced by Herr H—— for the use of metal ties on quite a different line from that of the North German recently noticed by us, which was, that Germany should sell its wood abroad, and produce iron and steel to take its place at home, thereby, from his point of view, producing an extra profit for German trade. Herr H—— has evidently studied the laws of exchange and barter more closely, but seems to keep his love of his fellow man within rather narrow limits. He rests his argument on the hygenic injury caused by the production of dust and rottenness from wooden ties, which evils he proposes to transfer to other countries by the exchange of good Austrian timber for foreign iron ore, to be worked up in Austrian mills, thereby rescuing the domestic iron industry from its present languishing condition.

Premiums to Employes.

Mr. E. Solacroup, an engineer in the material and motive power department of the Orleans Railroad of France, has presented to the International Railroad Congress a very exhaustive study of the subject of premiums to railroad employés, showing the practice on a great many of the European railroads. He divides the subject into five parts: First, premiums for maintenance and repairs of locomotives; second, premiums for economy of fuel and lubricants; third, for regularity in the movement of trains; fourth, sundry prizes, such as keeping locomotives clean, reports of injuries to plant, the instruction of apprentices, etc.; fifth, premiums to officers whose duties correspond to those of our superintendents and assistant superintendents of motive power and master mechanics.

Under the first head, that of premiums for maintenance and repairs of locomotives, the Belgian State Railroad gives no premiums to enginemen or firemen, but they are given to motive power superintendents and the superior officers of the shops. These depend upon the cost of repairs. Upon the Northern Austrian system a prize for maintenance is given, $100 to the engine driver and $35 to the fireman after running 68,000 miles without injury to the locomotive or tender. Upon the Eastern Austrian-Hungarian system and various French lines a maintenance premium is given, increasing with the mileage of each locomotive above a certain fixed minimum mileage. This is given in case the locomotive does not go into the shops for repairs, except those for which the engineman cannot be held responsible. On the Austrian-Hungarian state system the premiums for maintenance are as follows:

Engines with drivers of 68.42 in. diameter:

After 37,282 miles	$15
49,710 "	20
60,000 "	25
96,000 "	65
Total	$125

Provided the engineman has made the current repairs. For engines with drivers of less diameter the prizes are as follows:

4 wheels coupled, diameter 62.21 in. Mileage.	4 and 6 wheels coupled, less than 62.21 in. diameter. Mileage.	More than 6 wheels coupled. Mileage.	Premium.
24,000	21,000	16,800	$15
34,000	30,000	22,800	20
87,000	75,000	60.000	90

The premium of the fireman is one-tenth that of the engineman.

On the French State Railroads each engine is supposed to make the following mileage without going into the shops for repairs. An engine with four wheels coupled 12,000 miles, with six wheels coupled 9,000 miles. Any interruption of the service of the locomotive for repairs the expense of which exceeds $40 for labor, involves the cancellation of all mileage made before, and beginning the record again at zero, unless these repairs are caused by an accident or some fault of construction, or repairs which the district engineer certifies to be in no way from want of care on the part of the driver. In case an engine is run the mileage given above, premiums are awarded as follows; $1 per 600 miles for engines with two axles coupled, and $1.40 per 600 miles for engines with three axles coupled. On the Lyons road each engine must make the minimum mileage, excluding yard work, of 12,000 miles for engines with two axles coupled, and 9,000 miles for engines with three or four axles coupled. Any interruption of service on account of repairs exceeding twenty days nullifies the mileage already run, and the record begins again at zero. The premium is fixed at $1 per 600 miles for mileage over the requisite minimum. The fireman also receives a premium of one-third that given to the engine driver. On the Western Railroad of France a maintenance premium is given to enginemen for all mileage above the minimum fixed, made without the engine going into the shops for repairs, other than current and ordinary repairs, which can be made with a delay not exceeding five days. In this case, also, the premium is one dollar per 600 miles run. The minimum mileage which must be made by each engineman before receiving any premium is, for engines with a single pair of drivers 15,000 miles, with four wheels coupled 12,000 miles, with six wheels coupled 9,000 miles. On the Southern Rail-

road of France the maintenance premium is calculated on the following basis:

	Cents.		
Passenger engines	0 17	per mile	up to 3,000 miles.
"	0 25	"	over 3,000 "
Mixed service	0 25	"	up to 2,400 "
"	0.33	"	over 2,400 "
Freight engines	0.25	"	up to 2,100 "
Mixed or passenger	0.33	"	over 2,100 "
Freight	0.42	"	up to 1,500 "
"	0.67	"	over 1,500 "

The fireman receives a prize of one-third of that received by the driver. On the Eastern Railroad of France, a premium of 40 cents per 600 miles is given to the driver and 20 cents to the fireman, in case the engines make the following mileage:

36,000 to 72,000 miles for one pair drivers.
30,000 to 60,000 " two axles coupled.
21,000 to 42,000 " three " "
18,000 to 36,000 " four " "

A premium of 60 cents per 600 miles to enginemen and 30 cents to firemen is given for the following mileage:

72,000 to 108,000 miles for one pair of drivers.
60,000 to 90,000 " two axles coupled.
42,000 to 60,000 " three " "
36,000 to 48,000 " four " "

For further mileage the premium is $1.20 per 600 miles. Any engine going into the shops for repairs before having made the minimum mileage is subject to a fine of 60 cents per 600 miles for the mileage below the minimum. On the Orleans system the premiums are as follows:

Mileage to obtain a premium.				Premium.	
Passenger. 4 wheels coupled.	Mixed. 6 wheels coupled.	Freight. 6 wheels coupled.	8 and 10. wheels coupled.	Partial.	Total.
36,000	30,000	24,000	24,600	$32	$32
48,000	40,800	32,000	30,000	26	58
60,000	51,600	42,000	38,400	28	86
72,000	62,400	51,000	46,800	32	118
84,000	73,200	60,000	55,200	34	154
96,000	84,000	69,000	63,600	40	194
108,000	94,800	78,000	72,000	44	238
120,000	105,600	87,000	80,400	50	288

Besides the premium given above a premium of $25 is given for each 6,000 miles for the engines of the classes indicated in the first and second columns of the table, and for each 4,200 miles for those indicated in the third and fourth columns. These premiums are credited to the driver for the care taken of the engine on the line or while standing, and for repairs and the replacement of worn parts furnished from the shops. All repairs which the engineman considers necessary are entered by him on a register kept at the shops, but he shall undertake no repairs except with the authority of his superior officer. This officer controls the nature of the repairs, the manner in which they ought to be made, the time of the workmen employed, and the time the repairs should take. The repairs which do not enter into the account of the driver are the following: The removal and replacement of wheels, repairs to the cylinders and steam chests, repairs which require the use of machine tools, and various permanent changes. Such work as the dressing of joints, examination of pistons and packing, minor repairs to the machinery and cocks, are either made by the driver or for his account. At the end of each month the engineman checks up the time made by the workmen for his personal account. The maintenance premium continues as long as the engine does not go into the shops for large repairs. From this premium are deducted the wages for the time of shop hands at the rate of 10 cents an hour, and the cost of work done in the shops by hand tools on parts the maintenance of which should be at the expense of the driver. In case an engine entering the shop has been damaged in consequence of the negligence of the driver a fine is charged against him proportional to the time necessary for repairs caused by his negligence. When, from the necessities of the service, an engine passes through the hands of several drivers an account current is kept of the debits and credits of the premium account, and the balance is divided pro-rata among the various drivers.

(TO BE CONTINUED.)

Car Heating Law in New Hampshire.

The New Hampshire Senate has passed a bill regulating the heating of passenger cars by the railroad companies of that state. It provides that no car on any railroad in the state shall be heated by any method of heating unless such method shall first have been approved by the Board of Railroad Commissioners; that in no event shall a common stove be allowed in any such car; that any railroad may, with the permission of said board, make such experiments in heating their passenger cars as said board may deem proper; also that the provisions of this act shall not apply to mixed trains, or trains which consists of freight and passenger cars. Any railroad corporation violating any of these provisions shall forfeit a sum not exceeding $500. This act shall take effect Jan. 1, 1889.

Burlington Brake Trials—Correction.

AURORA, Ill, Sept. 16, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the hurry of making preliminary report to the Master Car-Builders' Association at the Minneapolis Convention, an error was made in the stops credited to the 50 mixed car train slack shoe test, by which the Carpenter brake is credited with making the shortest stops in general test No. 5. The Carpenter stops, 1,621 to 1,624, were close-shoe tests, coming under general test No. 2. The Carpenter slack-shoe tests were Nos. 1,051 to 1,054, which gives the shortest stop to the Westinghouse Co. The corrected table is given herewith.*

G. W. RHODES,
Chairman M. C. B. Brake Committee.

* The original table accompanying the report to the Minneapolis Convention will be found in the *Railroad Gazette* for June 17, page 397.

CORRECTED REPORT OF AVERAGE RESULTS BURLINGTON BRAKE TESTS, 1887. STOPS 1,051 to 1,054, 1,351 to 1,356, 1,431 to 1,434.

Note: Distances corrected for the exact speed noted and for level grade.

Kind of Stop.	Name of brake.	Speed. Miles.	Distance. Feet.	Time. From brake applied by engineer. Rear car. Brakes begin to apply. Seconds.	Time. From brake applied by engineer. Rear car. Brakes fully on. Seconds.	Time. From full stop. Brakes off rear car. Seconds.	Time. From full stop. Train moving. Seconds.	Time. From release signal till full release rear car. Seconds.	Number of cars released by hand.	Train. Total weight engine, cars and load. Tons.	Train. Per cent. braked.	Pressures. Before stop, train pipe. Lbs. or inches.	Pressures. Cylinder rear car. Lbs. or inches.	Pressures. Brake beam pressure, per cent. weight of empty car.	Couplings broken.	Slideometer movement, rear car. Inches.	Miscellaneous; brake casualties.	Wheels slid, distance.
50 mixed, slack shoes, electric	Westinghouse	20 30	178 456	¾ 1	4½ 5	51½ 63½	146 161½	50 48½	None. None.	1,041 1,041	49.3 49.3	85 lbs. 83	6¾ lbs. 6½			None. None.		175
	Carpenter	20 30	228 635	1 1	4½ 3¾	2½ ¾	37½ 46	13¾ 17¾	None. None.	1,480 1,480	42.6 48.6	61 lbs. 54	27 lbs. 24			1½ to 1¾ 1¾ to 2½		140 225
Ditto, air	Eames	20 30	416 751	12 12	18 24	24¾ 34½	235½ 576	24 28	None. None.	1,389 1,399	48.8 48.8	20½ 19½	12 in. 11		Two.	6 to 7 5½ to 6	Two hose came uncoupled owing to hose too short. In two cars load of wheels had slipped.	450

History of the Lake Shore & Michigan Southern.*

Mr. Leland opens with a résumé of the present magnitude of the road in mileage, traffic and earnings, and some reference to the extent of its operations and the low rates at which freight is carried. He believes that "the aggregate earnings of all the craft trading upon this great chain of lakes, from the St. Lawrence to the heads of Lake Superior and Lake Michigan, never in the most prosperous year enjoyed earned ten million dollars, which is considerably less than this road earned from freight alone in 1886, even at the low rates I haven given."

In 1868 what is now the Lake Shore & Michigan Southern Railway Company was in four companies, to wit:

The Buffalo & Erie; the Cleve and, Painesville & Ashtabula; the Cleveland & Toledo, and the Michigan Southern & Northern Indiana.

By a singular coincidence these four companies were each a consolidation of two companies, making eight original companies. I shall take up each chronologically.

ERIE & KALAMAZOO.

In 1833, the then Territory of Michigan, with a population of only about 35,000 (nearly 2,000,000 now), incorporated a company to build a railroad from Lake Erie at Port Lawrence (now Toledo), to the head waters of the Kalamazoo River, giving the company the title of Erie & Kalamazoo. The track consisted of a thin iron ribbon spiked on oak stringers, and would be rejected as a street railroad now. It was opened in 1837, the motive power being horses or mules for a considerable period. In that year, however, the first locomotive in the tier of great states bordering on the great lakes, and the third locomotive west of the Alleghanies, arrived at Toledo on a lake vessel for this road. It was named the "Adrian," built by the Baldwin Locomotive Works, and was their No. 80.

For ten years this road had a stormy and troublous existence, its affairs being managed sometimes by a commissioner acting for the board of directors, sometimes by trustees appointed by order of Court, and part of the time by a Receiver at the Toledo end and a Commissioner at the Adrian end, recalling the familiar anecdote of the retort of the mate of a vessel to the captain, "My end of this craft has come to anchor." In 1848 the road was sold out under accumulated judgments. Hon. Washington Hunt, of Lockport, N. Y., and George Bliss, of Massachusetts, were the purchasers. They leased the road Aug. 1, 1849, in perpetuity, to its rival, the Michigan Southern, then in operation from Monroe to Hillsdale, and, although it forms a part of the main line of the Lake Shore & Michigan Southern from Toledo westward, the Erie & Kalamazoo Company still exists, drawing and dividing its rental of $30,000 per year. This first consolidation settled the struggle for supremacy between Monroe and Toledo in favor of the latter city.

MICHIGAN SOUTHERN.

In 1837 the legislature of the state of Michigan projected and made provision for three railroads and one canal or railroad running across the four most southerly tiers of counties, which, at that time, embraced nearly all the settled part of the state. For the survey, location, construction and management of these roads, together with the improvements of certain rivers, and other minor improvements, they organized a Board of Internal Improvements and provided for a loan of $5,000,000. (Nothing mean about Michigan!) Prior to this time a number of railroad companies had been authorized to be incorporated by the territorial legislature, and three of them had made some progress in the construction of their respective roads. The oldest of them, the Detroit & St. Joseph, was nearly finished to Ypsilanti, but had not commenced running the road. The franchises, rights and property of this company were purchased by the state, and their line became a part of the Central Railroad intended to run across the state through the second tier of counties. The company had expended about $117,000, which amount the state paid, taking the road. The Detroit & Pontiac was about completed, and although the state aided that company by a loan of $100,000, the company continued in possession of the road, which is now a part of the Detroit, Grand Haven & Milwaukee. The Southern road was one of the projects of the state—authorized in the act of March 20, 1837. It was intended to run across the state, east and west, through the most southerly tier of counties, from the navigable waters of the River Raisin, near Monroe to New Buffalo, on Lake Michigan. (Chicago then was a mere Indian trading post, with Fort Dearborn in a quagmire.)

In the terrible crash which followed the wild real estate boom of 1836-37, when everybody "busted," Michigan "busted" too, and had a couple of unfinished strap railroads for sale. The Southern road, Monroe to Hillsdale, 68 miles, with the Tecumseh Branch, 10 miles, a total of 78 miles, was sold to the Michigan Southern, with Edwin C. Litchfield as its head, for half a million dollars. The transfer was made Dec. 23, 1846. J. H. Cleveland, who is still living, was the Superintendent of the road for the entire period of its operation by the state, 1840 to 1846. At the first meeting of the board of directors of the new company, the following quaint resolutions were adopted:

"*Resolved*, That no credit be given for freight or passage." (A steamboat phrase.)

"*Resolved*, That there be appointed two conductors, or captains of trains, who shall perform the duties of collector of freight and passage money, at $40 per month."

Little was done during the first four years after the purchase, beyond raising money, developing the great steamboat business on Lake Erie, etc., but in 1850, '51 and '52 a grand construction race for Chicago was going on between the Michigan Southern and Michigan Central. It was a neck and neck race, both roads reaching Chicago in May, 1852. The Michigan Southern Co. only extended to the Indiana state line, a little more than half way from Toledo, or Monroe, to Chicago. It is an interesting fact that all the original companies lost their names except this one; "Michigan Southern" forms a part of the title to-day. The connecting road under substantially the same (Litchfield) control was the

NORTHERN INDIANA.

In 1835 a member of the Indiana Legislature, whose friends desired to build a railroad from La Porte to Michigan City, 12 miles, introduced a bill incorporating the "Atlantic & Pacific Railroad." The other members laughed at so pretentious a name, when he, after much argument, came down to "Buffalo & Mississippi" as the title for his 12 mile road, and said he "would not yield another mile." So "Buffalo & Mississippi" was the title adopted. * * *

In February, 1837, the company was organized, and Robert Stewart (President), William Barber, Aaron Streeter, John B. Niles and John Brown elected directors. In the Toledo *Weekly Blade* of 1837 may be found the following advertisement:

Notice is hereby given that the grading of the Buffalo & Mississippi Railroad for a double track between Michigan City and La Porte, a distance of twelve miles, will be let at public outcry to the lowest bidder, at La Porte, on Monday, the 14th day of June next. The maps, profiles and estimates of the route will be ready for examination at the engineer's office in La Porte, after the 1st of June.

R. STEWART, President.

MICHIGAN CITY, April 28, 1837.

* A paper read by C. P. Leland before the Civil Engineers' Club of Cleveland, May 10, 1887.—From the *Journal of the Association of Engineering Societies.*

As the official record shows that this work was let on the day named, and names of contractors, prices, etc., stated, and as the records show considerable complaint by the contractors as to heavy discount on the company's scrip, it puzzled me for a time to ascertain where the contractors put in any work on this twelve miles, but Judge Niles, of La Porte, clears it up as follows: "The location of the road (La Porte to Chicago, *via* Michigan City) was very injudicious, having steep grades and requiring heavy work. About one mile through the woods west of and near La Porte was cleared and partly graded, and can still be seen. Some excavating was also done near the summit, six miles northwest from La Porte, and a strip was cleared through the heavy timber nearer to Michigan City. But under the pressure of the hard times, the whole enterprise had to succumb. It may be remembered that 1838 was that dreadful year of sickness and hard times. This enterprise had the life so completely knocked out of it that, during the ei ht years from 1839 to 1847, even the routine of annual election was neglected. In October, 1847, an effort was made to resuscitate the company, and the following gentlemen were elected directors: William B. Ogden, President; J. Young Scammon, John W. Brooks, Chauncey B. Blair, E. D. Taylor, John B. Niles, A. L. Osborn. They met and called upon the delinquent stockholders to call and settle. As but one man, and he the owner of two shares, responded, this board "threw up the sponge." Two years later, in October, 1849, Judge Niles and others concluded that having had a fourteen years' struggle with that ambitious title "Buffalo & Mississippi," and as yet not a foot of track laid, they would try a more modest name, and so organized the Northern Indiana Railroad. The control passed into the hands of the Litchfields, who were rapidly pushing the Michigan Southern west, and an May 22, 1852, the first train passed over the two roads, the Michigan Southern and the Northern Indiana, from Toledo to Chicago.

Three years later, in April, 1855, the Michigan Southern and the Northern Indiana were consolidated. This consolidated company, the Michigan Southern & Northern Indiana, was for a time very strong and prosperous, a favorite line for business from the day of its opening, and its stocks and bonds favorites as investments, or for speculation. It paid in 1855 and 1856 ten per cent. per annum to the stockholders. It launched out extensions and improvements, building the Air Line, the Detroit, Monroe & Toledo, the Jackson Branch and the magnificent steamers "We-tern Metropolis" and "City of Buffalo," costing $600,000. (They never earned expenses, and were sold after lying idle in Monroe several years, for $50,000.) In fact, the road was too enterprising and was caught with a heavy floating debt by the crash of 1857, its paper going to protest Aug. 19. 1857. For the six years, 1858 to 1863 inclusive, the road not only paid no dividends, but defaulted on all its bonds, and was kept busy compromising debts, staving of judgments, etc. Right in the worst of this dark period (June 27 1859) came the terribly fatal and costly Mishawaka accident. A very severe rain-storm of several hours' duration accumulated a large body of water in what is usually a dry gorge in summer, between South Bend and Misahawaka, Ind., and carried away a stone arch culvert of 9 feet span, with an embarkment of about 20 feet high over it, between 10:30 and 12:30 o'clock at night. The culvert was examined at 10 o'clock and it readily passed the water. The night passenger train from Chicago, with seven cars well filled, running at usual speed in Egyptian darkness, plunged into the gorge. By the crushing of the cars and by dro ning forty-three were killed outright or died soon afte wards, and sixty were injured. The roadmaster was on the engine and was killed. There was so little water in the gorge next day that a person could step across it.

At one time when the directors met in the company's office in New York, they had to borrow chairs from the neighboring offices to sit in, as the sheriff had carried off all the company's furniture. But the war, with its incidental greenback inflation, and feverish activity in business, came to the rescue in 1861-65, bringing this great property up out of the depths of bankruptcy. Its stock, which was way above par (145) in 1856, sold down to 5 cents in 1860, was again above par (109) in 1863. A most extraordinary and unparalleled fluctuation, in only seven years. From 1863 to 1869 was a period of growth and prosperity, gathering in by purchase the Kalamazoo & White Pigeon, and by lease the Kalamazoo, Allegan & Grand Rapids, and building great depots at Chicago and shops at Elkhart. In May, 1869, the history of the Michigan Southern & Northern Indiana came to a close by its consolidation with the Lake Shore Railway, forming the present Lake Shore & Michigan Southern. The Litchfields retired from the control and management the day before the company failed, in August, 1857. Whatever criticism was made upon their management, one fact was never disputed. They accomplished wonders in the brief period of one decade, and in the vernacular of to-day were "hustlers."

While across the base of the great peninsula of Michigan was an obvious and natural route for a railroad, a distance of only 243 miles, from Toledo or Monroe to Chicago—as against about 700 miles of difficult navigation by the great lakes—to build a railroad along the shores of Lake Erie, saving no distance and competing with the great fleet of magnificent steamers that were, in the season of navigation, plying daily, almost hourly, between Buffalo and Cleveland, Sandusky, Toledo, Detroit, thence on to Lake Michigan ports and Chicago, was universally felt, even as late as 1851, to be the silliest possible idea of a few cranks. In the "forties" the citizens of Erie, Pa., then a little borough of 3,500 inhabitants (Cleveland had but 6,071 in 1840) were watching intently the snail-like progress of the New York & Erie Railroad, which was building very slowly toward Lake Erie. The citizens of Erie, in 1846, organized a little railroad called the Erie & Northeast to build a road eastward to the New York State line, only 20 miles, of the same gauge (6 ft.) as the New York & Erie, with a view of virtually extending that great road beyond Dunkirk to Erie. The intervening gap of 28 miles was to be filled in by another company, called the Dunkirk & State Line. The system of roads in the State of New York, that, in 1853, were consolidated into the New York Central, viewed with alarm this movement in the interest of the New York & Erie, west of Dunkirk.

The Buffalo & State Line, 68 miles, to be standard gauge, 4 ft. 8½ in., the same as the New York Central, was started in Fredonia, N. Y., in 1848. * * * A prophecy by William Wallace, Chief Engineer, in 1850, I quote:

"When this road (the Buffalo & State Line) is completed and connected with the great lines which extend from the lake shore through Ohio and other Western States, the business will increase beyond all calculations, particularly during winter. It is not unusual at that season to see five stage coaches a day going West at two to four miles per hour, loaded with passengers. With all this in view, who can estimate with any degree of certainty the increase of business that would result from the substitution of the car and iron track for the stage coach?"

He did not dare to prophesy competition with the lakes.

In 1850, both the Buffalo & State Line and the Dunkirk & State Line roads begun work vigorously on their respective tracks westward to meet the Erie & Northeast, which also was building eastwardly. As it was evidently foolish to build two roads west of Dunkirk, a compromise was had; The Buffalo & State Line swallowed the Dunkirk & State Line, and moved over from Fredonia to Dunkirk, and was completed Feb. 22, 1852, with a standard gauge, running up against the Erie & Northeast, which was completed a month earlier (Jan. 19, 1852), with its gauge of six feet. Here was the basis of a big row, as we shall see presently.

CLEVELAND, PAINESVILLE & ASHTABULA.

The city of Cleveland, a favorite lake port with great steamboats coming and going, black with swarms of passengers, was naturally very skeptical as to the utility of a railroad along the shore of the lake eastwardly. She did not move in fact until pushed into it by the Painesville, Ashtabula & Geneva. Books for subscription to stock were opened at different points July 4, 1849, and on Aug. 1, 1849, the first meeting of these subscribers was held at the Weddell House, with General Abel Kimball, Chairman, and Heman B. Ely, Secretary. A year later (July 26, 1850) a contract was made with Harbach, Stone & Witt to build the road. The road was opened Nov. 20, 1852, and for 20 years paid dividends every six months, never less than 5, sometimes 8 or 10 per cent. Panics, hard times, war, pestilence or famine might come, but this road could say with the great apostle, "none of these things move me." A small stock investment made reluctantly by the city of Cleveland was the basis and chief factor of its great sinking fund.

Here then was a line from Cleveland to Buffalo, 183 miles, but right in the middle was the Erie & Northeast with its 6 ft. gauge, necessitating two transfers of both freight and passengers, one at Erie, and another at State Line, only 20 miles apart. And yet business was actually done that way for a year. As business increased this obstruction became intolerable, so on Nov. 16, 1853, a contract was made to change the gauge of this 20 miles to the standard. For various reasons the city of Erie was violently opposed to this. Hence followed the celebrated Erie war. It lasted from Dec. 7, 1853, to Feb. 1, 1854, closing the road between Erie and Harbor Creek, seven miles, over which bleak place passengers had to ride in sleighs, or walk, enduring all the rigors of a severe winter. A settlement was finally made by which the city of Erie compelled the two roads east of Erie to agree to build the Erie & Pittsburgh Railroad, and the Cleveland road to take half a million stock in the road, then called the Sunbury & Erie, now Philadelphia & Erie.

On Feb. 1, 1854, the first train passed from Buffalo to Erie, and on to Cleveland over a uniform gauge. On May 15, 1867, the Buffalo & State Line and the Erie & Northeast railroads were consolidated into the Buffalo & Erie Railroad, and on June 22, 1869, this company was consolidated into the Lake Shore & Michigan Southern, after a history of twenty years of marvelous growth and prosperity.

THE CLEVELAND & TOLEDO.

The Toledo, Norwalk & Cleveland Railroad, a Norwalk enterprise, was organized at a meeting held at the Court House in Norwalk, Sept. 24, 1850. The object of the organization was to build a railroad from Grafton, on the Cleveland, Columbus & Cincinnati Railroad, to Toledo, a distance of 87 miles. This was done rapidly (for those days), the last rail being laid at Monroeville, Jan. 24, 1853. The road was immediately overrun with business, and paid a dividend of 5 per cent. in July following. Under the careful, honest management of the President, Charles L. Boalt, of Norwalk, the road was built and fairly equipped for $15,530 per mile, which was $2,500 less than the estimate of the engineer, Mr. Harbach, who made the preliminary surveys, and about the same amount less than the road earns every year. Mr. G. A. Hyde, of this club, was the engineer in charge of construction of the western part of this road. About the same time (1850) a rival road was organized by Judge Ebenezer Lane, of Sandusky, aided by Elyria parties, called the Junction Railroad, to run from Ohio City, via Elyria and Sandusky, to Millbury, 9 miles east of Toledo (with a branch to Toledo), thence on through Perrysburg and Maumee to Swanton on the Air Line of the Michigan Southern & Northern Indiana—a total distance of 134 miles. Only the part from Ohio City to Millbury, 99 miles, was built, although the rest was nearly all graded, and the bridge across the Maumee River, at Perrysburg, was built. These two roads were consolidated into the Cleveland & Toledo Sept. 1, 1853, which company pushed the construction of the Junction road, or Northern Division, opening it to Sandusky Oct. 24, 1853, and to Millbury, near Toledo, April 24, 1855. After the crash of 1857, and the resulting depression in business, that portion of the northern division west of Sandusky was abandoned, the superstructure being taken away. While the Cleveland & Toledo had its ups and downs, like the Michigan Southern & Northern Indiana, it was, on the whole, very prosperous, returning good dividends to its stockholders. The two notable events in its life were the building of the iron bridge across the mouth of the Cuyahoga River, and changing the eastern terminus of the southern division, in 1866, from Grafton to Elyria. The Cleveland & Toledo and Cleveland, Painesville & Ashtabula railroads were consolidated in March, 1869, and called the Lake Shore Railway. Two months later this company was consolidated with the Michigan Southern & Northern Indiana Railroad, so in May, 1869, the consolidated Lake Shore & Michigan Southern Railway was born.

The new consolidated company immediately inaugurated an extensive system of improvements. The line between Cleveland and Buffalo was double tracked, the abandoned line from Sandusky to Millbury rebuilt, the old project of building the branch south from Ashtabula revived and carried to completion, the branch of Lansing, Mich., built, the Mahoning Coal Railroad to Youngstown built, the Jamestown & Franklin extended to Oil City. Large purchases of locomotives and cars were made, and other great improvements were contemplated, when came the financial cyclone of 1873, overtaking this road as the crash of 1857 did the Michigan Southern & Northern Indiana, and brought it up all standing. The next four years was a period of great depression—paying up debts, and paying small dividends, under the careful conservative management of Commodore Vanderbilt. Just a week before his death (Jan. 4, 1877) came that terrible Ashtabula accident, killing outright 92 persons and injuring 64. Only 8 escaped unhurt. Mr. George M. Reid, Superintendent of Bridges, and an esteemed member of this club, was on this train, but, fortunately, was one of the eight who were not injured. He dragged out of the car his companion, Harvey Tilden, then in charge of water supply, who was stunned and his clothing on fire. An idea of the terrible force of the wind that night may be gained by the fact that the car Mr. Reid was in (the last one), weighing perhaps 35 tons, was blown 65 ft. up the valley in falling 80 ft.

This accident cost the company directly three-quarters of a million dollars—saying nothing of the large indirect loss by interruption of business, etc.

As regards competition, the policy of all these roads has been exactly that which old Polonius advised his son Laertes to adopt, "Beware of entrance to a quarrel, but, being in, bear it that the oppressor may beware of thee."

It is a gratifying fact that in all its history of fifty years (1836-1886) this great enterprise was never stronger, more vigorous, physically or financially, than it is now; and there is no room for doubt that long after we are gone and forgotten, it will continue to be an important factor in the welfare of generations yet unborn.

After the reading of Mr. Leland's paper, gentlemen present spoke as follows:

Mr. G. R. HARDY (Chief Engineer of the road): Owing to my recent connection with the road the subject is probably more familiar to most of the members of the club than it is to me. From the present outlook I consider the L. S. & M. S. a magnificent piece of property. With regard to its location in connection with the New York Central it is more favorably situated than any line of which we know at present. As to its grade and alignment, the time is undoubtedly approaching when the gradients will be reduced to the neighhood of 16 ft. as a maximum, with one or two points where perhaps additional power will be used. When you connect that with the New York Central system, where they have only an adverse grade of 78 ft. for a short distance, the line may be called a level one. The alignment is wonderful. Between here and Toledo we have some 40-ft. grades getting up from the Cleveland station, and also about 25 or 26-ft. grades in short sections. East of this place the greatest adverse grades are on the Buffalo Division. On the Air Line Division we shall see most of the work of the coming year in reducing grades; all but one or two points will be brought down to 16 ft. On the Western Division there is only one place where the grade if such as to require a helper engine; the other 18 ft. grades are being reduced. I used to think that the largest business of the L. S. & M. S. was east-bound, but since I have become connected with it I find that it has as much business in one direction as another.

Mr. SEARLES: I would like to call the attention of the members to that long tangent of the air line and to suggest as a topographical reason for the length of it that it is almost exactly in the line of the axis of Lake Erie. Probably at one time the lake extended back to the Indiana line, and that swamp line may once have been the bottom.

Mr. SARGENT (replying to Mr. Searles): The general elevation of that tangent is 400 to 500 ft., perhaps in some places 600 above the lake level. Melburne is about 432. One time in that swamp country I had got down about 10 ft. when we struck something solid. We excavated and found the skeleton of a mammoth. It was a monster. A remarkable circumstance was that one of the fore legs was worn off quite round. The animal must have lost a part of the leg and gone about on the stump.

Mr. HOLLOWAY: The engines of 35 years ago were built from plans by and under the direction of Mr. Ethan Rogers, one of the earliest as well as one of the best engineers along these lakes. The peculiarity of Mr. Rogers' locomotives was that they were almost entirely built of wrought-iron and steel, and so constructed that they could weave and twist over the rough, uneven and unballasted roads of that early day without breaking down, which I believe the heavy cast-iron engines of to-day could not have done. Another peculiarity of the "Cuyahogs" was, that they used an independent steam cut-off valve, instead of cutting off by a link, as is now done; this enabled the engine to start up a heavy load quickly, and to pull it over the line economically. If you should happen to stray about the "round-houses," and listen to the tales there told by the old engineers, you would be led to believe that the Cleveland-built engines were indeed "Hustlers." A backwoods test was once made between a Cuyahoga engine and an eastern one as to the economy of fuel. Both engines started from Columbus with exactly the same load and the same quantity of fuel. With careful handling the eastern engine managed to creep into Cleveland as the last of the fuel was burned out, but the "Buckeye engine," as it reached Cleveland, gave one blast of defiance, and then went on to Painesville before it came to a standstill.

The Skidding of Car Wheels.

Mr. Jeremiah Head read a paper before the late meeting of the British Association at Manchester on the pieces of metal, resembling leaves of ferns, which are frequently found beside the rails on heavy grades, and gives the following analyses of specimens and of typical tires and rails:

Constituents.	Specimens.	Tires.			Rails.			Greatest Resemblance to.
		From	To	Average.	From	To	Aver. age.	
Phosphorus (P).....	0.06	.04	.05	0.046	.03	0.07	0 05	Rails.
Sulphur (S)	0.07	.01	.09	0.06	.04	0.14	0.07	Rails.
Carbon (C)	0 57	.24	.63	0.486	.35	0.60	0.475	Tires.
Silicon (Si).	0.09	.16	.33	0.274	.04	0.10	0.07	Rails.
Manganese (Mn). ...	0.79	.21	.52	0.390	.80	1.00	0.90	Rails.
Tin (Sn)....	0.07	..	..	.....	..	....	....	.....
Iron (Fe)...	98.35	..	..	98.742	..	....	98.435	Rails.
Total.....	100.00			100.000			100 000	

These specimens the author considers due to the sliding of the wheels of brake vans which are said to weigh 10 tons, "and have the power by their own brakes to skid the wheels should they find it necessary," besides which, when wheels of goods wagons are "spragged" the wear on their tires is, as many old railroaders will remember, very heavy.

The conclusions arrived at are, that the pieces have come from the tires of the skidded wheels and not from the rails, that they were formed at a red heat, and that they were forced out from behind the skidded wheels, the folds being on the under side, and that the only way to avoid the destructive action they indicate is to brake more wheels, and to an extent short of skidding. It will be observed that the analyses, so far as they prove anything, prove that the flakes came from the rails. But Mr. Head says that as blows of steel are often run indiscriminately into ingots for rails or tires, and as it cannot be stated certainly what was the composition of the identical tires and rails concerned in forming the flake specimens analyzed, it is hardly prudent to base an argument on the analyses.

Compressed Air Tram Cars.

The new extension of the tramway from the Louvre to Vincennes, reaching from the fort of Vincennes to Ville-Evrard, a distance of about six miles, was opened recently. The line is worked with compressed air engines. The trains usually consist of three cars, the engine being in the first car. The speed attained is sufficient to travel the whole distance, including stoppages, in about forty-five minutes. The store of compressed air required to make this journey is contained in nine separate plate iron reservoirs, fixed beneath the car. These are tested up to 60 atmospheres, but are charged up to about 40 atmospheres only. The total capacity is about 110 cubic ft. The engine is provided with a small vertical reservoir, holding about 45 gallons of water, heated initially up to the temperature of 70° C. (158° F.) The compressed air, before acting upon the piston, passes through this reservoir, whereby it becomes sufficiently heated to insure after expansion a final temperature high enough to prevent the formation of snow, and consequent clogging of the passages.—*Industries.*

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

All of our readers who are interested in the momentous question of the adoption of a standard coupler (and who of them is not interested?) know the action taken by the Master Car-Builders' Association at the last convention. They know that the executive committee recommended the adoption of a standard coupler of the Janney type, and that that recommendation has been submitted to a letter ballot of the association. We do not know how far the ballot has progressed or what are the chances that the committee's recommendation will be adopted. We do think, however, that its defeat would be very unfortunate. The committee well said, "Railroads have reached a point where there is absolute need for an automatic train coupler. It is vividly apparent that a coupler must be introduced to save the life and limb of the employé and decrease the cost of operation by enabling the use of power train brakes. * * * The public demands it, the safety of the trainmen demands it, and the economical operation of railroads demands it." The simple statement of the case is sufficient. So much has passed beyond the stage of discussion. As much might be said of the vertical plane type. The weight of mechanical authority is overwhelming in its favor. Whether or not any vertical plane coupler such as "will couple to and with this coupler [the Janney] under all conditions of service" may be considered sufficiently perfected in principle and in detail to be adopted as the final standard, is a matter of opinion; but there can be no question that there are practicable, serviceable and cheap couplers of that type now in the market, and in sufficient variety to insure that competition which will lead to perfection of details and keep the price reasonably low. Under such conditions, there is little reason for delay, while failure to adopt a standard now, in the beginning of the movement, will make it more and more difficult to accomplish. It is postponing that which is inevitable. The use of the automatic close coupler is sure to come, and will probably come fast. Already various roads are using it in one form or another and more are preparing for it; but every car that is equipped with something different from the final type will multiply the cost of introducing a standard and the opposition to it.

The signals and apparatus for the block system on the New York, Lake Erie & Western have been put in place, and an attempt was made last week to use them; but after two days their use was temporarily suspended. This appears to have been owing, however, in no degree to the system or the plan on which it was constructed, but to miscalculation in its installation. We have no information as to the exact cause of the difficulties in this instance, but generally in such cases the apparatus and the attendants are both at fault. The electrical instruments* being new, and the batteries likewise new, more or less adjustment is necessary; this an experienced attendant would accomplish in a moment. But the men are not experienced; and those who are quite familiar with the trains will, on the first difficulty, become confused and lose their heads. The code of bell signals for the signalmen to use in communicating with each other is as simple as the alphabet, but when a train is being held, and the man is worrying about how to give it the right to the road, every ring sounds like a summons from pandemonium, and he soon imagines that there are a dozen trains waiting on each track. In this state of mind he is about as likely to give intelligible signals at the proper time as he is to go out and buy a "15 puzzle" and come in and solve it. The final resort, according to the code, is to let trains pass the danger signal and run cautiously to the next station, but on a road with the Erie's traffic this can very soon block up a good many miles of track. The root of the trouble seems to be that a "trial trip" cannot be had. To try a new locomotive with a green engineman on a first-class passenger train would be regarded as anything but prudent; but that is just about what is done in principle here. The difficulty of getting trained men with whom to start a block signal system will, however, diminish as the block system extends.

* The Sykes locks, by which a train can enter a section only after the men at both ends of it have released the entering signal from the danger position, being used.

In another column will be found a letter signed "Loco" which is evidently written by one who has watched operations in the Grand Central yard, but we fear with the free eye of a critic instead of from the hampered position of a responsible worker. Nearly the whole trouble in this case seems to come from lack of room. The main difficulty with the waiting rooms and their accessories is that there are not enough of them. Even the crossing at 53d street would be obviated if there were room for inward tracks at the west side of the main train-house. More land ought to be taken, and, indeed, must be, unless a two or three story car shed is provided, but it would be much more valuable on the west side than on the east, unless a change were made in the running of trains above 53d street. If they were to continue on the left-hand track to Mott Haven or some other convenient point the crossing could be abolished and the arrangement of the station remain as at present. But with the present limitations we should be very slow to criticise the management of the switching. From our limited observation we should say the wonder is that things run as smoothly as they do, and without more accidents. To stop heavy inward trains at the foot of the grade where they emerge from the tunnel is certainly bad practice, and to be avoided if possible; but judging by railroad men's habits in general, we venture to say that it is done only when necessary. If the trainmen are like the usual kind they have loudly complained of all unnecessary detentions, and if the managers are half as wide-awake as managers in general, they have remedied the cause of the complaints if it was remediable. The making of running switches certainly is dangerous, as we have heretofore remarked, but we cannot see that the running of the engines into the train-house would save much, if any, time or work. Indeed, with trains that have four or five, or more, baggage cars, there is a slight saving in running only the passenger cars to the platform, as the cars next the engine can be more quickly placed at the baggage and express platforms. At Broad street, Philadelphia, all trains back over the river to the West Philadelphia yard as soon as emptied, so that there can be no fair comparison between the two stations. The Grand Central train-house could accommodate any quantity of traffic, but the tracks are used for storing empty cars. Mott Haven is six miles away, so that considerable land, even in New York, could be bought with the money which would represent the annual loss, direct and indirect, of hauling several score or hundred cars that distance and back daily. Giving signals by hand or mouth instead of by semaphores seems to be a practice hard to eradicate, but we never before heard of its occasioning delays. It is liable to weaken enginemen's respect for signals, however, and so should be looked after. We believe, though, that the conditions in the Grand Central yard were such that the Union Switch and Signal Company did not arrange all the details to its liking, and there may be some excuse for hand-signaling which does not generally exist.

We are still in the dark as to the cause of the accident on the Midland Railway of England, in which over 20 were killed and from 60 to 70 injured. The first despatches attributed it to "defective signaling." An excursion train standing on a railroad grade crossing was run into. Despatches of the 20th say that the Midland Company admits its liability and promises to deal liberally with the injured and the families of the killed. It should not be inferred from this, however, that this English company has more conscience or sense of obligation to the public than American companies, but that it knows that the Board of Trade investigation is very sure to fix the responsibility exactly where it belongs, and that there will be little use in quibbling. When our state commissioners are as well chosen as the Board of Trade experts, and invested with powers as large, there will be a substantial decrease in the crop of lawsuits following an accident, if not in the number of accidents.

Prof. David Swing, of Chicago, in an article on "Railroad Brains," printed in the Chicago *Evening Journal*, says:

> The educational power of the railway is kept back by the pitiable truth that many of its officials are not students of a great art, but are only speculators in land or stocks, when not absolute thieves. Many a superintendent is only an Ives in a smaller way. Quack railroad men are more numerous than quack doctors. Good men are discharged to make room for favorites, and thus fortunes and life are placed at the mercy of untrained minds. In the army a colonel was displaced that some cousin of the general's might have the position. When the new colonel rode out to exercise the boys at arms he told them "to do as they had done yesterday."

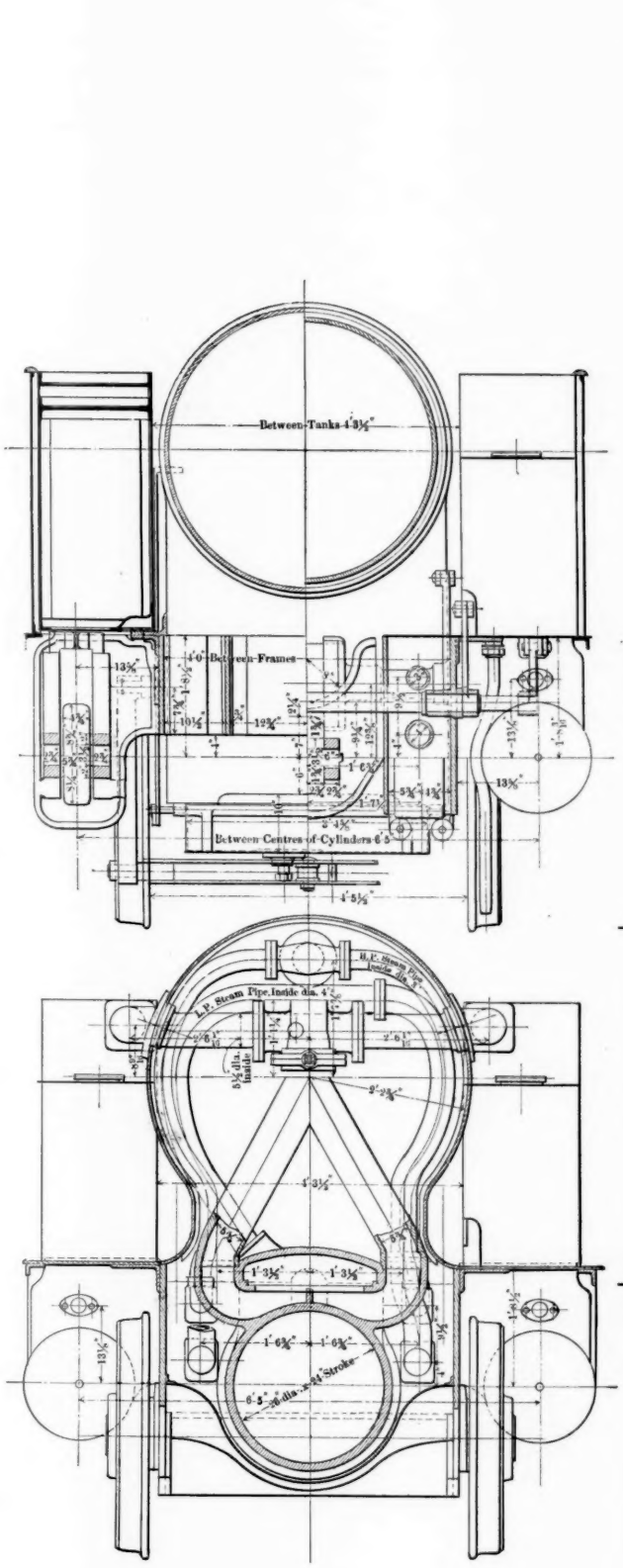
While the Professor's language concerning the number of railroad quacks is in the nature of hyperbole and may not be taken as really a very serious imputation on the general body of active railroad officers, it must be confessed that there is here and there a case, and that men resembling the colonel alluded to once in a while show themselves. But as a general thing an officer, however ignorant he may be on entering the service, must either learn or step out in pretty short order. At least this is generally true of superintendents and men in the transportation and mechanical departments. Perplexing questions come up too frequently to admit of such a position being endurable to an indolent person or one whose mind is elsewhere. Directors and others wishing to provide places for their nephews who have not a healthy natural ambition, generally know enough to put them in some other place than a superintendent's office, or in anything like a mechanical or engineering position, unless after more or less training. The story of the new Texas superintendent, who discovered through the plate-glass windows in the rear end of the directors' car that the rails a few miles back on a tangent had pulled out the spikes and crawled toward each other, is not only a fiction but a somewhat dreary one.

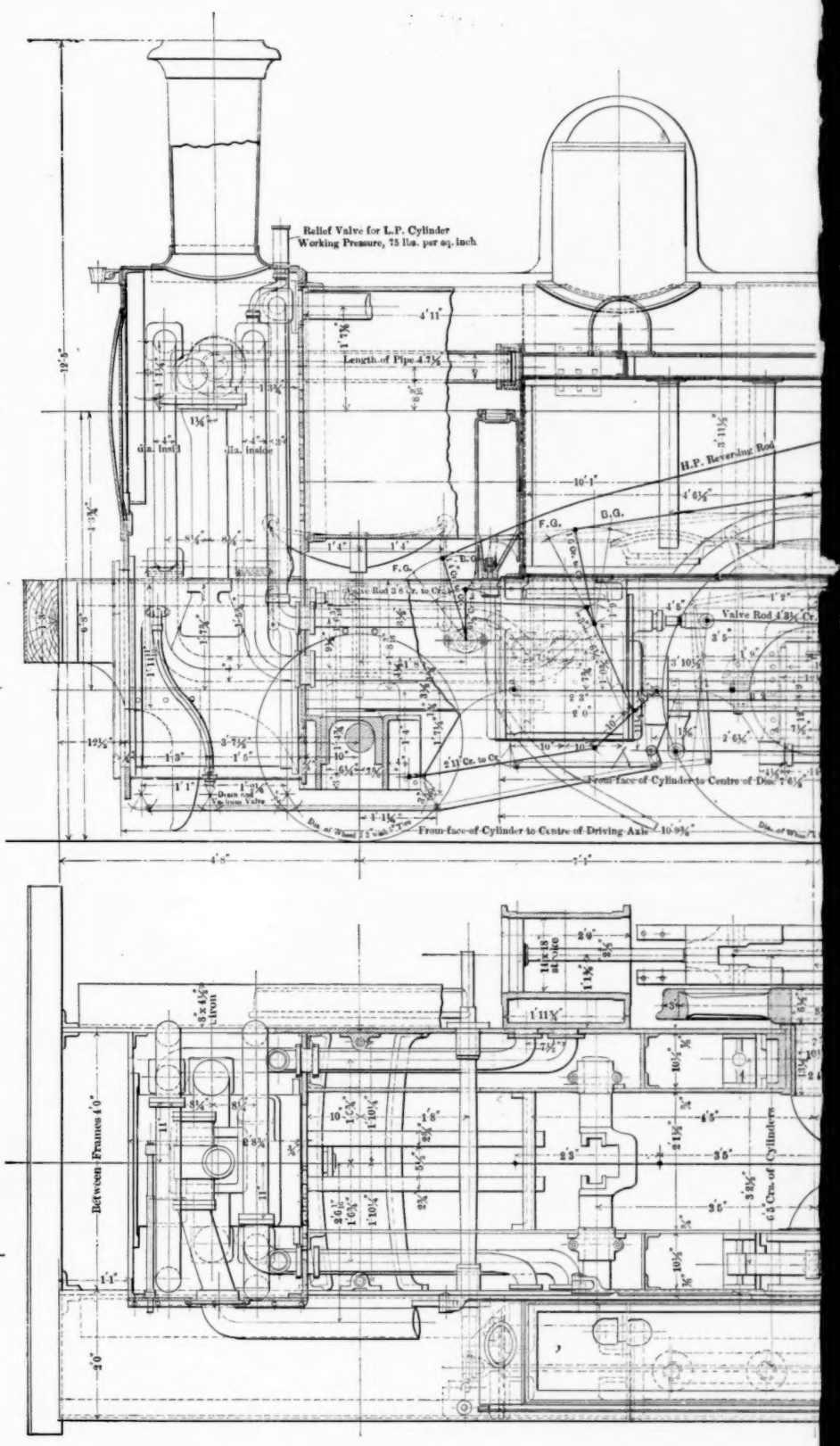
Inefficient men do bear titles and draw salaries, for presidents and general managers, impelled by a trait that is common to humanity, find it extremely hard to do justice to the aspiring and worthy men in the lower ranks, when the ties of consanguinity interfere to tempt them to do otherwise. But, generally, the affectionate (selfish?) parent or uncle, who perpetrates this favoritism, has enough burden of responsibility on his own shoulders to see that the toleration of inefficient service would injure the property to such an extent as to impair his own reputation, and he therefore places his protegé where experienced men above or below him can supply the most glaring deficiencies of the novice. The direct loss to the company is then limited to the salary the young man draws.

The only remedy for this evil is the raising of the standard of qualifications in each and every position so high that persons not fitted by experience and training in the lower grades will not even think of accepting them. A president's relative would not think of asking for a master car-builder's place; why should not the general freight-agent's qualifications be as sharply defined and as rigidly insisted upon as the master car-builder's? It is, however, futile to expect to wholly correct this unjust feature so long as men's hearts take so much greater share than do their heads in the government of their actions. A really intelligent and honest president's son would be willing to begin at the proper level to make himself a good master car-builder; but the father who should refrain from advancing that son any faster than he did the other young men of equal fitness would be regarded as heroic indeed.

THE TRUNK LINE FREIGHT MOVEMENT.

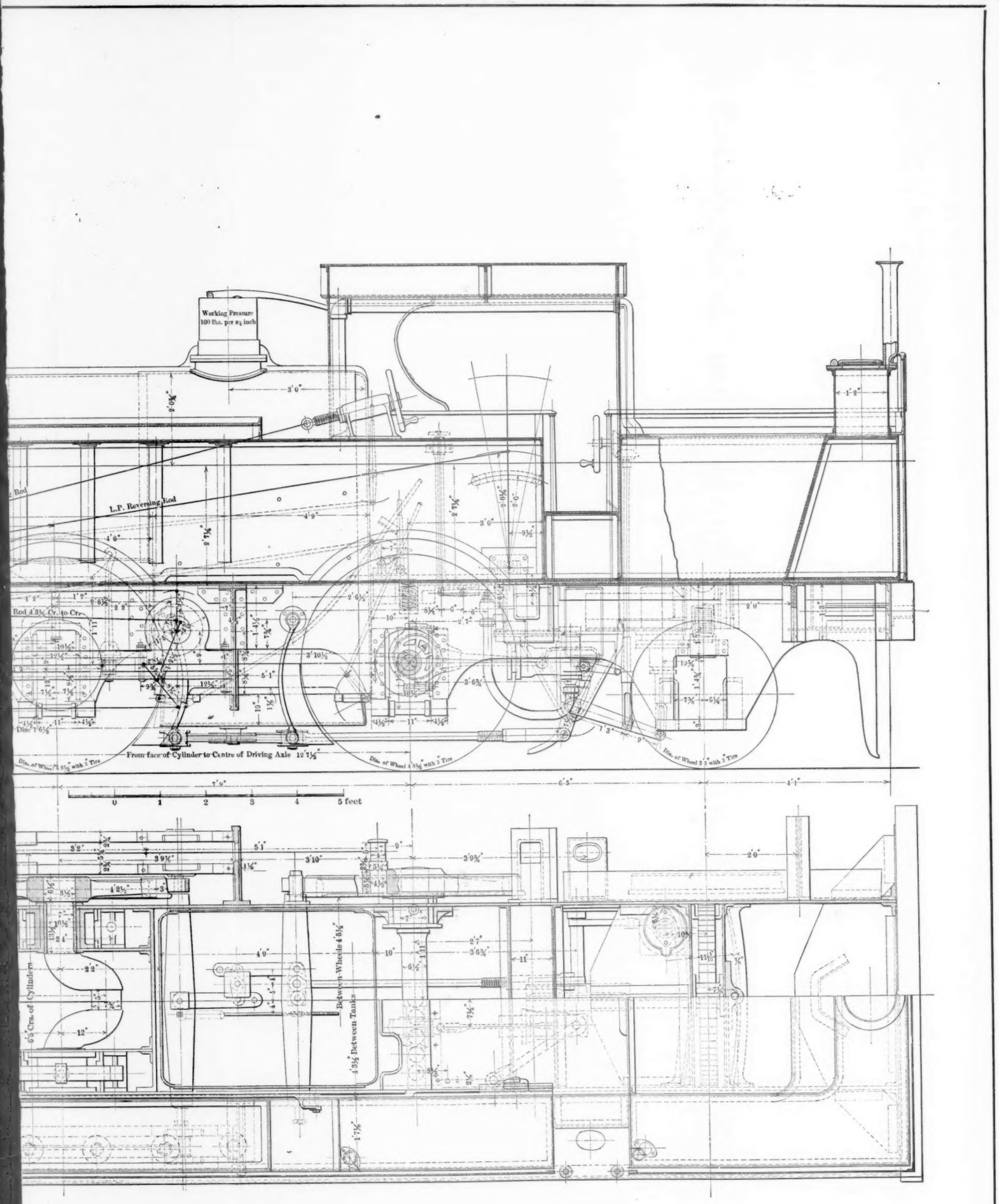
The eastward freight movement over the trunk lines this year has been very much like what it was last year, especially since March. This traffic, it may be remembered, has not grown much of late years. It has fluctuated from year to year, but the total shipments in 1880 were larger than in any following year until 1886, and very nearly as large as then. Considering the immense increase in railroad mileage in




Relief Valve for L.P. Cylinder
Working Pressure, 75 lbs. per sq. inch
Length of Pipe 4'7½"
H.P. Reversing Rod
F.G.
B.G.
Valve Rod 3'6" Cr. to Cr.
Valve Rod 4'3½" Cr.
2'11" Cr. to Cr.
From face of Cylinder to Centre of Dis. 1'6½"
From face of Cylinder to Centre of Driving Axle 10'9⅜"
Between Frames 4'0"
6'5" Crs. of Cylinders

COMPOUND LOCOMOTIVE FOR

Designed by MR. F. W. WEBB, *Mechanical Engi*


Working Pressure
100 lbs. per sq. inch
L.P. Reversing Rod
Rod
From face of Cylinder to Centre of Driving Axle 12'7½"
Dia. of Wheel 7'1" with 3" Tire
Dia. of Wheel 4'8½" with 3" Tire
Dia. of Wheel 3'3" with 3" Tire
0 1 2 3 4 5 feet
Between Wheels 4'6½"
Between Tanks
Ctrs. of Cylinders

FOR SUBURBAN TRAFFIC.

...l Engineer London & Northwestern Railway.

the west since 1880, and the immense increase of traffic on the western railroads, it seems strange that this should be so, but that it is so the statistics show unmistakably. These shipments (freight of all kinds shipped eastward for any distance over the trunk lines from their western termini) have been as follows for the eight months ending with August, in tons:

Year.	Tons.	Year.	Tons.
1880	7,321,827	1884	6,313,498
1881	7,409,966	1885	7,243,913
1882	5,894,622	1886	7,192,676
1883	6,418,742	1887	7,321,539

Thus the shipments this year are not much different from those of the two years preceding, were the same as in 1880, and very little less than in 1881, but much larger than in any of the three years from 1882 to 1884, inclusive.

The total eastward movement being substantially the same now as it was in 1880 and 1881, the movement over the old lines must be considerably less, the Lackawanna and the West Shore having been opened since that time. That the total traffic does not grow is doubtless because of a great increase in the population west of Buffalo and Pittsburgh engaged in other industries than farming, so that much of the farm produce which formerly had to seek a market in the East or in Europe is now consumed in the West itself, where the growth of town population has been very great. Moreover, there has not been such an increase of agricultural production as might be supposed from the extension of railroads through, and the partial settlement of, large districts formerly almost unoccupied. The crops of the years which supplied the heavy traffic of 1880 and 1881 were remarkably large—those of the great staples larger perhaps, taking them all together, than any the country has had since. Thus this east-bound traffic of the trunk lines has become a much smaller proportion of the total traffic of the country and of the trunk lines themselves than it was formerly. The traffic between interior points in the West has grown immensely, as well as passenger traffic and other local traffic—a natural consequence of the growth of town population throughout the country west of the territory of the trunk lines.

The summer movement in this direction may often be affected by the harvest, a good harvest and good demand for grain causing a considerable increase over a year of bad harvests. Last summer, however, the eastward shipments were nearly the same as the summer before, and for eight years the summer movement (June, July and August) has been:

Year.	Tons.	Year.	Tons.
1880	3,299,626	1884	2,562,030
1881	3,235,690	1885	2,472,128
1882	2,459,258	1886	2,901,329
1883	2,355,073	1887	2,938,083

This year the movement was from a sixth to a fourth larger than in the four years from 1882 to 1885, but a tenth less than in 1880 and 1881. The August movement was 4 per cent. less than last year, 5 per cent. less than in 1880 and 9 per cent. less than in 1881, but more than in 1884 and 1885, and more than the average of the last eight years. Last year the eastward movement was unusually large in every month after August.

The *west-bound* movement of through freight over the trunk lines has been remarkably large this year, and it is noticeable that it was especially large in August—larger than in any previous month when rates were maintained, except last March, when apprehension concerning the effect of the Inter-state Commerce law, which was to take effect the next month, caused extraordinary shipments. Thus the shipments from New York, Boston, Philadelphia and Baltimore through to the western termini of the trunk lines, or to points further west, have been in August for eight years:

Year.	Tons.	Year.	Tons
1880	166,837	1884	173,287
1881	211 064	1885	177,077
1882	199,722	1886	176,395
1883	183,588	1887	218,709

Thus even in 1881, 1882 and 1885, when very low rates stimulated shipments, they were not as large in August as they have been this year. These shipments reflect the activity of trade, but doubtless trade generally has not been 24 per cent. greater than last year, as the figures show the shipments to have been. And examination shows that the increase has been very large in the sixth or lowest class of freight, which class includes, rails, pig-iron, old scrap, etc. (as also sugar and coffee). Now the iron imports have been unusually large recently, and comparatively small shipments of iron (compared with the country's consumption of iron) would make an appreciable portion of the trunk line shipments westward. On many days recently the shipments of sixth class freight from New York have been more than half of the total shipments, and since July they have been about 47½ per cent. of them.

For the eight months ending with August the through shipments from these four cities have been:

Year.	Tons.	Year.	Tons.
1880	1,223,396	1884	1,281,110
1881	1,240,354	1885	1,259,262
1882	1,589,570	1886	1,199,284
1883	1,201,332	1887	1,454,322

Thus the shipments this year were exceeded only in 1882, when extremely low rates diverted from the canal even the coarsest of freights, and when imports of iron were very large. It will be noticed that, with the exception of this year and 1882, the shipments have varied very little, and that they were *smallest* last year.

The same cause which has prevented the increase of east-bound shipments has kept down the westward movement, notwithstanding the great growth of the country and the great increase in its consumption of merchandise; a larger part of the goods consumed in the West is produced in the West itself.

The great gain this year, with rates probably as well maintained as in any other year, is the more remarkable because the movement has been so stationary in previous years, and because there have been no unusual exports of produce, such as swelled the national income for two or three years previous to 1882. It seems that it must be chiefly due to unusual investments of capital in construction, railroads first of all, but also manufactories, and other buildings in towns and cities. This has not only caused an immense increase in the production, transportation and consumption of all construction materials (seen most plainly in the article iron), but it has also kept workmen everywhere fully employed, given profits to manufacturers, merchants and contractors, and so made them consume more freely than usual goods of almost every kind. Times of unusally large expenditures of capital are always prosperous times. The trouble with them is that they cannot continue (else the expenditures would not be unusually large); and when the construction which absorbs the capital ceases, or is much reduced in amount, almost all interests suffer. It is not easy to estimate the time when such activity must cease, but the indications are strong now that there will soon be a falling off in railroad construction at least. Bonds of the soundest companies, for which until about a year ago there was what appeared to be an insatiable demand, now are marketed with great difficulty, and these very companies are, many of them, postponing the construction of lines which they had planned, content apparently to complete the work which is already under way. All but a small part of the railroad now under construction, except perhaps in the South, is owned directly or indirectly by old companies, mostly with excellent credits, and they are pretty sure to complete the work they have actually begun, and this will make construction active for the remainder of this year, and probably a part of next, while if the money market becomes easy, there may be quite the average amount of railroad building next year. When such enterprises have been begun, it is not easy to stop. During the last period of active railroad construction it became difficult to get money as easily as in the last half of 1881, and the condition of business then was certainly much less favorable than it is now; yet in 1882—business continuing bad—much more railroad was built than in any year before or since.

Certainly the statistics show a remarkably large movement of freight westward, proving that the country has been buying much more goods than usual, and confirming other evidence of the present activity of trade. This activity continues, the shipments from New York in the first two weeks of September having averaged 4,942 tons per day, against 4,865 tons per day in August and 4,170 tons for the whole of September last year. Shipments, however, are usually larger in the first than in the second half of September.

The increase in shipments this year has been general at all the four ports except Boston. It had large gains in the first three months of the year, but has had none since. An explanation of this is that imports of pig iron, steel billets and blooms, and similar materials which are consumed at iron works, are not likely to be imported at Boston, and the imports of these have been larger this year than for some time previous. Philadelphia has shipped much more than last year in every month except January, February and April, and in August more than in any other month of any year, and Baltimore has had a decided gain in most months.

From New York alone the shipments have been:

Year.	3 mos. to March 31.	5 mos. to May 31.	8 mos. to Aug. 31.	August.
1880	274.717	405,529	680,246	92,042
1881	267,450	462,970	730,420	120,886
1882	397,446	618.448	1,015,894	115,862
1883	262,663	425,797	688,460	96,991
1884	300 072	488.315	788.387	101.040
1885	273,575	514.315	787,890	106.447
1886	270,941	449,833	720,774	100,741
1887	338,041	557,628	895,689	131,589

The shipments in the last five months have been under the Inter-state Commerce law. There is no evidence that it has had any effect on the aggregate amount of them, except in March, when they were 154,448 tons this year, against 104,845 last year; and probably in April, when shipments were doubtless the smaller because of the great quantity hurried forward the month before. This did not prevent the April shipments from being nearly 14 per cent. more than last year; but in May the increase was 46 per cent., in the three months before April, 25 per cent., and in the four months after April 24 per cent. We have given the shipments for different periods to illustrate this and the fact that the increase this year has been continuous, fully as large recently as in earlier months.

THE CANADIAN PACIFIC IN MANITOBA.

The President of the Canadian Pacific under date of Sept. 12 issues to his shareholders an address setting forth the company's side of the Manitoban question. The essential part of his statement was given in the *Railroad Gazette* July 1, last. It is that the original contract of the company provided that for 20 years no other companys should be authorized by the Dominion Government to build a line of railroad to any point within 15 miles of the international boundary. This stipulation was made because of the exceedingly onerous and dubious task undertaken by the Canadian Pacific Company—a task so uncertain in its outcome that "without this provision for protection the necessary capital could not have been secured, and the railway could not have been built." The enterprise was regarded by the people and the government of the Dominion as of the highest importance, both for political and for trade considerations, and they were willing to secure its successful building and operation by the protection of the "monopoly clause" of the contract. Now, the people of Manitoba hold that this clause is without effect in their province. On the other hand, the act which settled and defined the Constitution of Canada assigns to the jurisdiction of the Dominion Parliament all matters not specifically delegated to the provincial legislatures, and it is held that the power to legislate concerning railroads to the boundary is not given to the provinces. It is on this point that the question turns. Whether or not the Dominion Government could bind a province to carry out such a stipulation as the one made in the monopoly clause is the question to be settled; unless, indeed, the question gets itself settled by mutual concessions, without making a final test of the federal authority in the matter. It is possible that the legal and political complication will keep the American friends of the enterprise from putting their money into it, and that it will fall for want of funds. Vice-President Oakes, however, in his report to the President and directors of the Northern Pacific, states that the Duluth & Manitoba branch will be completed early in November, that the grading of the Provincial road is finished, and that "we hope soon to secure railroad connection with Winnipeg."

The immediate profit, either to our Northwestern cities or to the Northern Pacific of this Manitoba line is probably greatly overrated in the popular estimation. In the document before us Sir George Stephen puts the population of Manitoba at 100,000. Certainly it is not a rich population, and its trade must long be small, even with the advantage of competitive rates. This trade will be fought for by Duluth, Minneapolis and St. Paul, and by the Canadians. Transportation rates would naturally be reduced to the lowest possible figure by the three competing companies; and and although the Duluth & Manitoba Branch of the Northern Pacific down the Red River Valley lies in a fertile and comparatively well-settled country, it is paralleled on either side by the lines of its rival at distances probably nowhere greater than 20 miles. Indeed, from the tone of Mr. Oakes' report one may infer that the desire to retaliate upon the Manitoba was not entirely absent from the minds of the Northern Pacific directors when they decided to go to the international boundary.

To the people of Manitoba, however, and to the Canadian Pacific the matter is of far greater importance. In the first place the principle involved is one which affects both deeply. While it is true that the completion of 66 miles of railroad undertaken by the government of Manitoba will not "ruin the vast Canadian Pacific system," its territory for 1,600 miles, from the Lake of the Woods to the Pacific, is exposed to the inroads of its southern rivals, and in that distance many tempting openings will no doubt be found as the country grows. It becomes, therefore, most important that the principle of Federal control should be upheld, and that the Canadian Pacific should be protected by its contract with the Dominion government from the incursions of the Yankee.

To the people of Manitoba, on the other hand, defeat in the present attempt means not only the hampering of their trade relations where those relations promise most, but it means the surrender of some of that right to regulate their own affairs which is so dear to all free people.

The President of the Canadian Pacific points out the sense of reciprocal obligation which his company has felt, and how it has felt morally bound by this protective clause to deal liberally with the people of the provinces. He states that simultaneously with the commencement of work on its main line the company laid out and commenced work on a system of branch lines extending south and southwest from Winnipeg, and has expended more than $5,700,600 on branch lines in Manitoba. While this is true, we doubt if the people of Manitoba will be much moved by the statement of the fact. Too many of them remember that these lines made it possible for the main line to be built in the time required by the contracts. Their practical usefulness in bringing in construction material, immigrants and supplies is so apparent that it is doubtful if any one ever before thought of their moral purpose. "Partly in view of the same moral obligation, but chiefly for the purpose of promoting the development of the country" the company has made, it is said, its rates lower than those of any railroads similarly situated in the United States. The average earnings of the company for three years have been, in cents :

	1884.	1885.	1886.
Freight, per ton per mile	1.45	1.20	1.10
Passengers "	2.60	2.45	2.10

The earnings of the whole system of the United States for the same year were :

	1884.	1885.	1886
Freight, per ton per mile	1.12	1.06	1.04
Passengers "	2.36	2.20	2.18

From these figures it looks probable that the Manitobans have no good reason to complain of excessive rates; and, indeed, it is very unlikely that the company has been guilty of the impolicy of exorbitant or discriminating rates.

To us on this side of the line there is this injustice in the present arrangement, that the Canadian Pacific may invade our territory while we cannot retaliate in kind.

THE EDUCATION OF RAILROAD EMPLOYES.

I.

The conviction is growing on railroad managers and on the public generally that some new and more efficient means must be provided for the better education of railroad employés. The larger problems of railroad economy are often poorly understood by men high in authority : the best methods of keeping the accounts and transacting the business of a railroad are probably seldom employed ; while the rank and file of those who construct and use the plant of the company are almost wholly ignorant of the scientific principles in accordance with which their daily duties ought to be performed. A product of this feeling is the article by Mr. Walter G. Berg in the issue of this journal for Sept. 9, in which he outlines a plan for a railroad college. He very cleverly enumerates the various subjects which should be taught in such a school ; and the establishment of some such means of larger education is only a question of time. It would seem much wiser and easier, however, to develop them from, or add them to our present technical schools, which are now so well prepared to cover a large part of the ground outlined, all the scientific part of it in fact. There has always been too strong a tendency to multiply the number of schools of high aspirations, rather than to increase the strength of those already in existence.

Two general courses of study could be established, called, perhaps, railroad engineering and railroad management. The course in railroad engineering would include parts of the present courses in civil and in mechanical engineering (including electrical engineering), with considerable added directly in the line of the construction and use of railroads, their rolling stock and appliances. The course in railroad management would include a fundamental training in the elementary mathematics, mechanics, physics and chemistry, followed by a study of the various departments of railroad business, administration and accounts, and the larger questions of railroad economy and law.

If the school is to be established wholly independent of any particular railroad offices or shops, it is not apparent why the present well-endowed and equipped institutions should not be utilized so far as they go. There are already signs pointing to this kind of a development, and the time is probably ripe for fully established departments of this kind in connection with such schools as the Massachusetts Institute of Technology, the Rensselaer Polytechnic School and Cornell University. In the absence of such courses of study, the Pennsylvania road takes the graduates of these and other technical schools, and undertakes to systematically teach them the practice of that company in its various constructive departments. This is fairly satisfactory so far as it goes, but we have yet to hear of any systematic training of young men for traffic and operating departments of railroad work.

There are, however, two great objections to this solution of the problem, whether the railroad school be independent of or in conjunction with the present technical institutions, and they are :

First. The impossibility of teaching railroad *practice* in any department without going directly into the employ of a railroad company to learn it. *Practice is only to be learned by practice*, and the practice is a large part of the matter to be taught.

Second. Any school, or number of schools, cannot possibly educate more than a very small proportion of the young men entering the employ of our railroad companies, who imperatively need such education.

For these two reasons every large railroad company which builds and operates its lines for the largest ultimate returns, and not for the largest immediate dividends, will find it to its advantage to educate its own employés, to discharge only for cause, and to promote only for merit. This applies to the great body of its employés, but it would hardly be profitable for them to undertake that higher and exceedingly expensive education required of the specialists employed by the company, such as their civil, mechanical and electrical engineers, chemists, lawyers and doctors. These should be still taken from the special schools and trained in the practice of the company.

So far as railroads are managed by, or in the interest of, stock jobbers, or the stock owned on speculation rather than on investment, any improvement in methods of management must be impeded. The advantages to the company of better education and preparation on the part of the employés for their work are attained only after many years, and even then are of the impalpable and immeasurable kind. Just when and how a thousand dollars spent in the education of employés is to come back to the company has no particular and definite answer, and *that* it will come back in some way and time requires some mental breadth and grasp to clearly see.

It is greatly to be regretted that the experiment by the Baltimore & Ohio Company, started two years ago, of educating their apprentices, was not carried to a full development, and thus given a fair trial. So far as it was tried it gave great satisfaction, and until the recent disturbances in the internal affairs of the company there was every prospect that the education by the company of its own employés would be thoroughly tried. What was actually done was to require apprentices to pass an examination in elementary English branches, and then to teach them two hours a day the elements of drawing, mathematics and mechanics. After but two years of this work, the character and tone of the apprentices was greatly raised, and some of them already gave great promise of developing into good draughtsmen, foremen and superintendents. The elaborate report of Dr. W. T. Barnard, assistant to the President, on "Technical Education in Industrial Pursuits, with especial reference to Railroad Service," has been generally circulated and reviewed. This report was so conclusive in its arguments that the Board of Directors made a permanent appropriation of $20,000 annually for the support of a School of Railroad Technology, which should give instruction to all apprentices in the company's Baltimore shops, for two hours a day for four years, and then advanced technical instruction to a suitable number of the more apt apprentices and to others, for half the day for three years. Some 3,000 workmen are employed in these shops alone. They are not only repair shops, but the company undertakes to build all its locomotives, cars and bridges. There is no technical school of advanced grade in Baltimore, so they felt constrained to include the higher branches of technical science, and so to duplicate to a large degree the work of our technical schools. Here would have been a near approach to Mr. Berg's idea, but with the incalculable advantage of allowing the students to spend half their time in the actual business of the company in the several departments for which they were fitting themselves. Besides, a large proportion of the students in the higher courses would have been through their four years apprenticeship in the shops, and would, therefore, have been regular journeymen mechanics, and familiar with all the minutiæ of rolling stock construction. This, of itself, would be of great advantage to any railroad employé, in no matter what department he might be placed.

The road had called a board of scientific and practical men together to formulate a scheme for the higher work of the school, and there was every prospect that a most interesting and novel experiment in the education of railroad employés would be given a thorough trial, when suddenly the whole scheme was indefinitely postponed on the departure of President Garrett for Europe. It is to be hoped this school will yet be revived and resolutely pushed forward.

Here was a school that reached the rank and file of the employés of the road, and began at the bottom, and with the boy when he first entered the service. Furthermore, it opened up to this apprentice boy the whole line of service, from bottom to top, such positions as he could show himself fitted to fill being within his reach. The poor boy had an equal chance with the rich, for he could support himself by his labor throughout the schooling period ; even the shop journeyman would come to have a fair knowledge of the principles involved in his work, and from him up the affairs of the company, both constructive and operative, would be managed by men specially educated for their duties. The scheme seemed thoroughly rational and practical, and it is hard to see how else the thing is to be done. Our large railroad corporations can afford to each have such a school of its own, and from the different kinds of management would soon be evolved the fittest methods, which would then survive.

On account of the impossibility of adequately teaching the railroad practice, in its several departments, in a school entirely separated from railroad shops and offices, it is not probable that such schools can do much more than teach the *principles* of railroad construction and management, and of railroad business, accounts, economy and law. Doubtless enough could be properly taught in such a school to warrant its title of Railroad College, or School of Railroad Technology, but that it would be at all adequate to the needs of our actual railroad service we do not believe.

In a subsequent paper we shall endeavor to give some suggestions as to the establishment of schools of railroad technology by large railroad companies.

Northwestern Grain Receipts.

The receipts of grain and flour converted to bushels at Chicago, Milwaukee, Duluth, St. Louis, Peoria, Toledo, Detroit and Cleveland for the months of July and August, for five years, are compared below. The quantities are given in bushels:

	1887.	1886.	1885.	1884.	1883.
Flour, bls.	2,096,816	1,448,023	1,013,225	1,705,6.8	1,341.941
Wheat...	0.670 951	26,958,796	12 774 262	21.105,719	16,768,153
Corn.....	11,691 554	20.201,529	18,082,575	16,591,533	22,765,384
Oats.....	17,187 570	15.884,491	12,689,3:2	12,026,472	13,425,969
Barley....	1,605,783	2,000.921	395 069	553,547	464.331
Rye.....	431.691	634 2s8	594 954	1,216,932	1,821,416
Tot'l grain	51,587,529	65,680,025	43,936,172	51,494,173	55,245,253
Flour to bushels.	9.435,672	6 516,104	4.559.513	7,675,326	6.038,734
Gr'd tot'l	61.023.201	72,196,129	48,495,695	59.169.499	61 283,987
P.c. flour.	15.5	9.02	9.4	12.9	9.8

The receipts of flour during July and August of 1887 have increased over the four years preceding by the following percentages :

1886.	1885.	1884.	1883.
30.9	51.69	18.65	33.0

The wheat receipts show the following changes by percentages.

1886.	1885.	1884.	1883.
—24.32	+38.20	—2 06	+18.87

+ Increase, — decrease.

The decreased movement of wheat at Northwestern primary points in face of an unusually active export movement has been mainly owing to the almost continuous rain falls in the Northwestern states during the harvest. The treshing was in consequence delayed, and that has checked the movement of the new crop to market. The wheat went into stack, very much of it, in such damp condition as to be unfit for threshing until the sweating process in stack shall have been completed.

The receipts of corn during July and August, 1887, are smaller than in any year from 1883 to 1886, and were 42.12 per cent. less in 1887 than in 1886 ; 35.34 per cent. less than in 1885 and 29.53 per cent. less than in 1884 ; and 49.08 per cent. less than in 1883. There are several causes combined, resulting in a diminished movement. The crop of 1886 was 1,665,441,000 bushels, against 1,936,176,000 bushels in 1885. The drouth diminished the prospective crop of 1887, causing the farmers to be conservative in their deliveries until they could estimate their new crop. The export demand for Europe in consequence of good corn crops in South Russia, Roumania, on the Danube, in Austria-Hungary and in the Argentine Republic, fell off for the fiscal year ended June 30, 1886, from 63,655,433 bushels, to 40,307,252 bushels in 1887, the corresponding time, being a decrease of 23,348,181 bushels.

The receipts of oats during July and August, 1887, at Northwestern primary points have been larger than in 1883, 1884, 1885 and 1886. They were 7.55 per cent. more than in 1886; 29.66 per cent. more than in 1885; 30.02 per cent. more than in 1884, and 21.88 per cent. more than in 1883. The crop of 1886 was 624,134,000 bushels, against 629,409,000 bushels in 1885, and the crop of 1887 is believed to be about 625,000,000 bushels.

The receipts of barley and rye during July and August (especially the former) are unimportant.

The changes in total receipts of all kinds of grain at Northwestern primary points during July and August, 1887, as compared with former years, were by percentages:

1886.	1885.	1884.	1883.
—21.49	+14.83	+0.10	—6.62

+ Increase, — decrease.

The changes in total receipts of grain and flour together were:

1886.	1885.	1884.	1883.
—15.47	+20.52	+3.03	—0.40

The movement of flour is every year increasing. About 75 million barrels are now made in the United States per year at some 28,000 mills.

River Shipments from St. Louis.

The shipments by river from St. Louis by boats and barges are given below in tons of 2,000 lbs.:

	1885.	1886.
To Upper Mississippi	48,295	46,190
" Lower Mississippi	442,850	431,945
" Illinois River	865	5,171
" Missouri River	10,330	24,255
" Ohio River	17,130	26,060
" Cumberland and Tennessee rivers	9,955	25,075
" Red and Ouchita rivers	4,750	3,195
Totals	534,175	561,895

For the five years before 1886 the total tons were:

1884.	1883.	1882.	1881.	1880.
514,910	677,340	769,905	884,025	1,038,350

The monthly grain shipments by boats and barges in 1887 are given below. During January the river was frozen as far South as Cairo till nearly the end of the month. The quantities are given in bushels:

1887.	Wheat.	Corn.	Oats.	Rye.
January	24,500	.....	.....	.....
February	134,193	1,393,779	64,524	.....
March	192,633	1,343,407	133,391	.....
April	868,99	915,963	258,420	.....
May	894,448	664,200	248,961	.....
June	579,602	670,294	79,052	.....
July	719,822	6 6,680	152,759	.....
August	363,449	343,962	97,191	560
Sept. to 12th	73,923	144,143	37,075	.....
Total	3,531,769	6,122,425	1,071,373	560

The total is equivalent to 294,539 tons.

The shipments from St. Louis by river, though larger than from any other point, do not comprise all the shipments. There are considerable shipments from places both above and below St. Louis, as well as from points on the Illinois River. The shipments from St. Louis and other places via the Ohio River are mostly destined for Newport News, via the Chesapeake & Ohio Railroad. The shipments via the Tennessee and Cumberland rivers are largely of corn for consumption in the interior of the more southerly states. These states, however, this year, have, most of them, an unusually good corn crop, and will not require to draw so much as heretofore from the more northerly states.

In this inter-state commerce, the shorter and more direct railroad lines are more and more active competitors with the tortuous and longer water lines. The river tonnage is consequently not growing and scarcely holds its own in the competing race.

The average river rates of freight on sacked grain by steamers per 100 lbs. and bulk grain by barges have been on Mississippi River:

Year.	Sacked grain—Steamers per 100 lbs.	Boats and barges per bu.	Years.	Sacked grain per 100 lbs.	Barges, bulk bush.
1877	21c	8½c.	1882	20c.	5⅞c
1878	17½	7¾	1883	17¾	5½
1879	18	7¾	1884	14	6⅝
1880	19	8¼	1885	15	6⅜
1881	20	6	1886	16	6⅛

The rates in January, February and March are 6@6½c.; April, May, June, 5@5½c.; July, August and September, 5½@6c.; October and November, 7c.; December and January, rail to Cairo and river, 8½, wheat being ¼c. more than corn.

The crop statistics of recent years for several wheat producing and consuming nations are given in *millions* of bushels in the table below. The crop of 1887 is estimated from preliminary reports. The figures for periods of years are the averages:

		Crop.	Export.	Import.	Home Supply.
Russia	1872-1881	198	61	....	137
"	1882-1885	226	61	....	168
"	1886	....	50	....	....
"	1887	Av'ge	60*	....	....
Italy	1872 1882	137	3	11	145
"	1886	129	....	....	....
"	1887	118	....	18 to 20	....
France	1876-1885	301	10	51	342
"	1886	299	....	....	....
"	1887	312	....	....	....
Sweden	1874-1882	3.2	0.4	1.6	4.4
Belgium	1876-1885	22	7	23	38
"	1886	19	....	....	....
"	1887	Av'ge	....	....	....
Holland	1872-1882	5.6	4.7	11.3	12
"	1886	4 9	....	....	....
"	1887	Av'ge	....	....	....
German Empire	1878-1885	04	12.3	25.5	118
"	1886	82	....	....	....
"	1878	107	....	....	....
Denmark	1875-1882	4.6	3.5	1.3	2.4
"	1866	4.7	....	....	....
Austria-Hungary	1874-78-82	118	7.8	6.9	117
"	1883-1886	150	....	....	....
"	1887	150*	15 to 20*	...	....
Algeria	1871-1880	17	2	..	....
Egypt	1867-1876	..	3	....	....
"	1877-1883	...	3	....	....
Switzerland	1883-1886	2	....	10	....
"	1887	High	....	...	...
Spain	1881-1885	95	....	....	....
"	1886	86	....	....	...
"	1887	Low	....	....	...
United Kingdom	1876-1885	81	2.6	131	210
"	1887	71.5	....	144.6	....
Australia	1873-1884	28.6	10.7	3.2	...

* Probably subject to considerable correction.

British rail exports to the United States have been much larger this year than in any other since 1882, having been for the eight months ending with August for the last nine years:

Year.	Tons.	Year.	Tons.
1879	13,532	1884	16,118
1880	156,689	1885	4 843
1881	294,231	1886	21,114
1882	153,226	1887	110,499
1883	47,313		

The exports to this country were especially large in August, amounting to 19,534 tons, against 1,815 last year. The quantity this year was never exceeded in August before except in 1881, when it was 29,583 tons; but there have been many other months when it was larger.

The last number of the *Sanitary Engineer and Construction Record* reprints a communication to the *Times*, setting forth the claims of Evans as the first to apply high pressure steam to either stationary or locomotive engines, and as also the first to recommend and offer to build a railroad for the conveyance of freight and passengers to be operated by a practicable engine, one that should make 12 or more miles per hour, as he did in 1809.

Our contemporary recommends that the American Society of Mechanical Engineers appoint a committee to prepare a report which besides doing justice to the inventors of that time will secure a general recognition of the services of Oliver Evans, and suggest a monument to his memory in Washington, which city occupies land that was a portion of Maryland in 1787, when that state granted Evans his patent.

This proposal has the hearty approval of the *Railroad Gazette*, as it doubtless will of all connected with the use of steam in this country, for in the steam dredge which Evans constructed 1½ miles from the Schuylkill in 1789, and which was driven by its own wheels to the river and then by a stern wheel down the Schuylkill and up the Delaware, was shown a practicable germ of the high pressure and expanding engines now in use.

For years the scarcity of capital in this country induced inventors to go with or send their studies to England in hopes that the more abundant money and higher industrial development of that country would afford them encouragement they could not obtain here, and Trevethick and Vivian were doubtless greatly aided in their labors by the fact of Evans having sent his plans to England in 1794-5 by Mr. Sampson, of Boston. These facts are not new to our readers, but a contributor to the *Times* states that all school books treating of this subject which have fallen into his hands follow the romance of Samuel Smiles. The proposed committee could dispose of many claims for priority, though it is doubtful if the habits of original research of our schoolbook manufacturers will ever lead them to investigate the reports of scientific and technical societies.

The accidents reported this week afford striking illustrations of the serious results that may ensue from the most ordinary causes, and of the fact that if mileage and traffic are both to be increased by such large percentages the accident record is likely to follow suit, unless additional precautions are taken. Ten people are reported killed almost on the same day by two collisions involving passenger trains, and both on the same road, though on widely separated portions of it. Two freight wrecks, both on virtually the same road, and on the same day, are blown up by car-loads of explosives, involving a loss estimated at near $100,000. If ten *passengers* were killed at one place on the same day the public would be aroused for a day or two; and yet this comes dreadfully near that. One of the wrecks apparently resulted from a train breaking in two, but the causes of the others cannot be certainly learned from the accounts. The warning that these disasters should be studied and their lessons taken to heart is being thrust upon our dull ears anew very frequently this year. However calloused the public may become, railroad managers have no right to disregard it. These accidents happened in Pennsylvania, Ohio, Iowa and Dakota, and the commissioners of these states—or the people, where a commission has not been established or is hampered by scant appropriations—have a plain duty to perform. They ought to have as thorough an investigation as would be made by the Board of Trade if the casualties had occurred in England.

The volume of passenger business business between St. Paul and Minneapolis, and the intelligent and enterprising way in which business is provided for have recently been the subject of comment in these columns. The St. Paul, Minneapolis & Manitoba has recently begun laying two additional tracks, making four in all on their road-bed between the two cities, and the work is now in progress. It is expected to shorten the running time to about 17 minutes, instead of 25 minutes as at present. The St. Paul & Minneapolis Rapid Transit, which is incorporated, hopes to secure the necessary permission from the City Councils to proceed with its work. In that event the contracts will be let for the construction of an elevated road. It is stated that the structure as designed will cost $90,000 to $100,000 per mile, and that electric motors are to be used.

The New England Railroad Club has opened its season with a meeting which assumed the shape of a feast instead of a technical discussion, and the tone of the report indicates that they had a good time. The general good feeling was such that the catholic proposition to draw all kinds of railroad officers into the association found expression and favor. Such a gathering certainly is desirable and would be profitable, but it would have to be always held at the Quincy House, or some other house with a banquet hall, and not at the rooms in the Boston & Albany station. There is no getting around the fact that the life of the ordinary meetings of this and other like clubs is in "talking shop," and it is equally undeniable that an auditor's shop or a general freight agent's has only slight ties connecting it with a master carbuilder's. Railroad men ought by all means to get together socially oftener than they do; but to do it successfully they must have the festive board in order to the proper breaking of the ice; and the ladies will always be necessary in order to neutralize the heaviness that is likely to creep in.

The results of the working of twenty-one principal railroads in England and Wales for the first six months of 1887, as compared with a similar period last year, show a very general though not a large increase increase in gross earnings, net revenue, and dividends to ordinary stockholders. The gross earnings have increased $2,500,000; the working expenses only $700,000, and the net earnings (after adding balances, etc., from preceding half-year), $2,300,000. After paying fixed charges, etc., the stockholders receive ove $2,000,000 increase on their dividends in 1886.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887, not before reported, is given as follows:

Arizona Mineral Belt, from Flagstaff, Ariz., south, 36 miles, 18 miles since last reported.

Elmira, Cortland & Northern, from Canastota, N. Y., to Camden, 20 miles.

Kansas City & Pacific, from Grant Centre to Moran, Kan., 16 miles.

Montgomery & Florida, from McLaren's Mills, Ala., to Live Oak, Fla., 10 miles.

Pacific Coast, from Los Alamos, Cal., south, 15 miles.

St. Louis, Iron Mountain & Southern, since last reported from Augusta to Wynne, Ark., 35 miles.

This is a total of 114 miles heretofore unreported, making 4,911 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

Miles.	Miles.	Miles.	Miles
1887.....4,911	1883.....3,995	1879.....2,224	1875..... 804
1886.....3,674	1882.....7,285	1878.....1,267	1874.....1,101
1885.....1,696	1881.....4,774	1877.....1,396	1873.....2,778
1884.....2,619	1880.....3,607	1876.....1,677	1872.....4,970

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

TECHNICAL.

Locomotive Building.

The Portland (Me.) Co. has recently shipped a big digester, 30 ft. long and weighing over 15 tons, to a Philadelphia pulp and paper mill. It has also just delivered a 47-ton locomotive to the Maine Central, and one of 48 tons to the Boston & Maine. The company has over a half dozen locomotives now under way in its shops, and is also driven with orders from packing companies all over the state.

The Louisville, New Albany & Chicago has received from the Rogers locomotive works two 53-ton consolidation engines.

The Baldwin Locomotive Works in Philadelphia are employing over 2,000 hands, and for the first six months of the present year turned out 318 locomotives. They have orders on hand for 150, and the output for the year will, it is estimated, reach 650, the largest number ever known.

The Boston & Albany is to build 6 new switching engines.

The Car Shops.

The Harrisburg, Pa., car works has received an order for 200 tank cars from the Standard Oil Company.

Bridge Notes.

The city engineer of New Haven, Conn., will advertise at once for bids for constructing a stone arch bridge at Rock Lane. The estimated cost is $120,000.

City Engineer Artingstall, of Chicago, by order of Mayor Roche, is estimating the cost of a four-tracked steel bridge, turned by steam, at Madison street and the Chicago River. A popular estimate is $1,500,000, not including necessary land condemnations.

Fitz Simmons & Connell are awarded, by the North Chicago Street Railroad Company, the contract to build the substructure for the new Dearborn street bridge for $30,000.

Articles of association were signed at Mechanicsville, N. Y., this week, for the organization of a corporation to be known as the Mechanicsville Bridge Co. The capital stock is placed at $20,000. The bridge will be at a point where the Hudson River is comparatively narrow and where the bridge will be easily reached from the centre of the village.

The New York, New Haven & Hartford has given a contract to the Keystone Bridge Co., of Pittsburgh, Pa., for the bridge over the Connecticut River at Lyme, Conn. The cost is to be $100,000.

Bids are requested for a bridge across the Niobrara River, at Fort Niobrara, Neb. Address Lieut. J. W. Summerhayes, Quartermaster, U. S. A., Omaha, Neb.

The Atchison, Topeka & Santa Fe will build a bridge at Lexington, Mo.

The county commissioners of Rockingham, N. H. will build a bridge at New Market.

The county commissioners will build a bridge across the Oconee River, at Dublin, Ga.

The county commissioners will build a bridge at Bridgeport, Conn. Cost, $80,000.

The commissioners of Rome, Ga., will build a bridge over the Oostanaula River at that city.

The Decatur (Ala.) Bridge & Construction Co. has been awarded the contract for building a bridge across the Tennessee River at Chattanooga, to cost $198,000.

Manufacturing and Business.

A meeting of the Spliced Rail Joint Co., of Pittsburgh, Pa., will be held Oct. 11, to vote on a proposition to increase its capital from $100,000 to $500,000. The growth of the company's business requires more money, and it is probable a new steel mill for the manufacture of the invention will be provided for.

The New Haven (Conn.) Electric Co. is about to erect another engine, this being the eleventh one, and two more boilers, making eight in all, in order to supply the demand for both arc and incandescent lights furnished by them. The engines were all built by Armington & Sims, and the boilers are tubular.

The Jenks Railway Car Signal Co. is incorporated in Chicago; capital stock, $200,000, to manufacture machinery. Incorporators, E. G. Keith, James W. Scott, James W. Brockway and B. F. Jenks.

The Dunham Manufacturing Co., of Boston, reports an increasing business in its storm proof car door. It is used by the following railroad companies: Cleveland, Columbus, Cincinnati & Indianapolis; Fitchburg; Central Vermont; Canada Atlantic; Ogdensburg & Lake Champlain; Portland & Ogdensburg; Philadelphia & Reading; Providence & Worcester. Orders for trial equipment have been received from 17 other companies in the north and southwest. The Inter-colonial Railway Co., of Canada, has specified the Dunham door on cars to be built at the Ontario Car Works, Cobourg Car Works and by J. Harris & Co., St. John, N. B.

The Gould-Tisdale Railway Signal Co. is placing some of its signals on the Boston & Maine and Central Vermont roads.

The Steel Tubular Car Co. has been organized at Alexandria, Va.

The Wainwright Manufacturing Co. of Boston, with works at Medford, has shipped its feed-water heaters during the month of August to the following places: 2 to New York City, 2 to Philadelphia, 1 each to Bangor, Me., New Britain, Conn., Newark, N. J., Summerfield, Md., Cleveland, O., Decatur, Ala., Waukesha, Wis., and St. Paul, Minn. It reports that orders and inquiries as to its specialties are constant and increasing.

The Ball Engine Co., of Erie, Pa., is running night and day to supply the demand for its high speed automatic cut-off engine. The greatest demand for these engines comes from the electric lighting interests. This company has turned out during the first half of of this year in the neighborhood of 15,000 horse-power.

The Pawtucket (R. I.) Manufacturing Co. is sending to Hutchinson, Hollingsworth & Co., Dobcross, near Oldham, England, two button head bolt machines, two nut machines and one special machine for finishing bolts, etc. It is building a complete outfit of button head bolt machines for the American Screw Co., Providence, and has sent one of its square head bolt machines to the Champion Bar and Knife Co., Springfield, O.: two to Clarke Bros. & Co., and one to the Upson Nut Co., Unionville, Conn., all of the last mentioned machines being accompanied by patent revolving furnaces.

The Union Indurated Fibre Co., Portland, Me., has recently built a large brick stack for its boiler, and has just completed an entire change in its baking ovens and the interior work of its treating house. It is also adding new machines, which, with the changes noted above, will nearly double the capacity of the factory.

Iron and Steel.

The Spang Steel & Iron Co., Limited, of Pittsburgh, Pa., has contracted for the steel plates to be used in the construction of the boilers for the new Fall River steamer Puritan, which will be built at the shipyards of John Roach's Sons, Chester, Pa.

The blast furnace now in course of erection at Ashland, Wis., will be completed by Dec. 1, and will have a capacity of 80 tons a day.

The Frazer & Jones Co., Syracuse, N. Y., who recently had a $90,000 fire in their foundry and saddlery hardware works, are now building on a site that they recently bought in Geddes, a suburb of Syracuse, several large buildings, to be known as the Syracuse Steel Foundry. The works will be rebuilt immediately.

The new Bessemer steel plant of the Springfield (Ill.) Iron Co. started this week. The Bessemer steel mill has received the finishing touches. The rail mill, which has been running on bar iron and splice bars, shut down, and several hundred men are now working night and day replacing the rail rolls, which have been unused for two or three years. This work will be done and the mill be ready to roll steel rails again in about a week. The company have orders to keep them running for some time, and are prepared to make about 6,000 tons of Bessemer steel rails per month. The bar mills are also running full time on bar iron, splice bars and light rails, and about 1,000 men are now employed at the works.

The Union Iron Works, of San Francisco, are shipping a full complement of machinery for a quartz mill in China, the second mill they have sent.

The Salem Iron Works, of Salem, N. C., will start a branch foundry and machine shop at Apopka, Fla.

The North Star Iron Works, Minneapolis, Minn., will remove to St. Louis, Mo. The capacity of the company's works will be doubled, and between 400 and 500 men employed, as against 220 at present.

Graff, Bennett & Co. are building a new puddling department of 18 double furnaces to their mill at Millvale, Pa., on which the work is progressing very rapidly. The department, when completed, will give work when on double turn to over 200 men and turn out about 75 tons of muck iron a day. This company operates three mills, in which almost every department is on double turn.

The new blast furnace now in course of construction at the Pueblo, Col., steel works will be completed in about two months, and its completion will double the capacity of the works and give employment to about 600 more men.

Foreign capitalists have taken an interest in the East Birmingham Iron Roofing & Corrugating Co., at Birmingham, Ala. They have decided to erect a rolling mill and reorganize. The company hereafter will be known as the East Birmingham Iron, Steel & Corrugating Co. The new plant, work on which is to be begun immediately, will be a large sheet bar-plate and steel rail mill, with capacity of 80 to 100 tons per day, when completed. The rolling mill will immediately adjoin the corrugating works. It is expected to have the rolling mill in operation by Jan. 1.

The Trussville & Cahaba River Land Co. has been organized at Trussville, Ala. It proposes to build iron furnaces, rolling mills and other similar enterprises.

Sleaman, Sleeth & Black, proprietors of the Phœnix Roll Works at Pittsburgh, Pa., have just completed an extensive addition to their plant by the erection of a foundry 60 × 100 ft. The building is of iron and is a most complete one throughout. It contains two 80-ton steam cranes with the greatest capacity of any in the United States, with the single exception of one or two used by the government in the navy yards.

The steel works of J. R. Thompson & Co., Jersey City, N. J., were burned this week. Loss, $100,000.

The Rail Market.

Steel Rails.—The only sale reported this week is a lot of 2,500 tons to a Western road. Quotations, $36@$37, according to time of delivery.

Old Rails.—One sale reported of a 500 ton lot of tees, delivery Toledo, O., at $25; 700 tons American tees and 1,000 tons foreign tees at $23.50. The market is generally quiet.

The Waldumer Brake.

The Waldumer Electro-Magnetic Brake Co., of Cincinnati, are to have a series of tests of their freight train brake on the Cincinnati, Washington & Baltimore road, between East Norwood and Bond Hill, O., on Sept. 27 and 28. The train consists of engine and cars which have been in regular service on this road, and the testing ground is a 2-mile stretch of the road on a grade of 68 ft. per mile. The tests will be conducted by Maj. Lewis M. Hosea, who has been appointed for the purpose by Railroad Commissioner Cappeller, of Ohio, the brake company having requested the commissioner to order a public trial. The special feature of this brake, and the point which it is expected to bring out at the tests, is the facility with which it can be adapted to a train in which cars not fitted with the apparatus are interspersed. The programme of the tests is as follows:

1. *Service Stops:* At stations going to and returning from testing grounds. 2. *Signaling Engineer and Applying Brakes from Caboose:* Going to and returning from testing grounds. 3. *Emergency Stops:* Speed 45 miles per hour; down grade, 68 ft. per mile. 4. *Breakaway Stops:* Train to be parted at speed of 45 miles per hour, down grade of 68 ft. per mile, and brakes applied automatically on rear portion. 5. *Gradation Test:* Speed to be reduced from 30 to 15 miles per hour, and maintained uniformly to bottom of grade. 6. *Foreign Car Test:* A like number of foreign freight cars to be interposed alternately in train without disturbing brake system.

Other practical tests upon request.

The Westinghouse Freight Brake.

A press dispatch from Burlington, Ia., Sept. 21, says:

It was demonstrated that a fifty-car train equipped with the Westinghouse brake, running at a speed of 40 miles an hour, can be brought to a stand in a distance of 695 ft. without any shock, and at 20 miles an hour in 155 ft. without any shock.

The Simplon Tunnel.

A dispatch of Sept. 20 from Geneva announces that the preliminary agreements with reference to the projected tunnel through the Simplon have been signed. The tunnel will open in Italian territory. The Swiss and Italian governments each contribute 15,000,000 francs.

Western Society of Engineers.

The 239th meeting was held Sept. 6. Mr. William A. Lyden, Assistant Engineer Drainage and Water Supply Commission, Chicago, was elected a member.

The papers read were "The Municipal Engineer and the Management of his Office," by Mr. Schreiner, and "The Size of a Field Party," by Mr. Van Auken.

Union Switch & Signal Co.

This company is putting in two large interlocking systems on the Pennsylvania at Pittsburgh, and is at work on a number of new towers on the Philadelphia and Middle divisions of that road. In addition to the roads named in the *Railroad Gazette* of Aug. 19, the company has contracts from the Atchison, Topeka & Santa Fe; Chicago, Milwaukee & St. Paul; Chicago & Northwestern: Pittsburgh, Cincinnati & St. Louis; Philadelphia & Reading; Central of New Jersey; Baltimore & Ohio; Lake Shore & Michigan Southern; Kings County Elevated (Brooklyn, N. Y.), and the Wisconsin Central. The business of the company bids fair to largely exceed that of any previous year.

The Toulmin Crossing Gate.

The Toulmin Electric Railway Gate Co. gave a public exhibition last week at Bellair Park, Baltimore, Md., of their electrical contrivance for the protection of railway crossings. The test was entirely successful. The crossing is protected by a rail 27 ft. long, which is lowered from its perpendicular position to a horizontal one across the street by the approaching train, the electrical connection being made by the engine depressing a lever alongside the track, and after the train has passed the guard is raised by the same automatic action.

Dredging in the Clyde Estuary.

The *Railroad Gazette* of July 1 gave the cost of dredging in the St. Lawrence for a depth of 27½ ft. as on the average $11\frac{6}{10}$ cents per cubic yard, the Shale rock in place having cost $33\frac{5}{10}$ cents, boulders 65 cents, and one clay cut $2\frac{7}{8}$ cents per cubic yard. Mr. Charles A. Stevenson's paper, lately read before the Institution of Mechanical Engineers, gives the cost of removing 408,895 cubic yards of soft stuff from the estuary of the Clyde, the depth of cutting being 23 ft. at low water, as 2.54 pence per yard, and carrying in self-propelling hopper barges with capacity for 523 tons of dredged material, as 2.47 pence, or a total of 10.01 pence yer yard. Dredging a very stiff clay, packed with boulders, cost 18.03 pence per yard.

Both works are being conducted by the engineers in charge of the improvements, and the dredges in both instances are ladder or elevator dredges.

The Clyde, as the author states, has been converted from a fordable stream, below Glasgow, to one capable of taking in on tides a vessel drawing 24 ft. to that city, and the first proposition for the improvement of the stream contemplated a harbor at Greenock, as the good people of Glasgow did not care to have "drunken sailor bodies" about their streets.

National Association of Stationary Engineers.

From the annual report of this Association we learn that there has been an absolute gain in active membership during the year immediately preceding of 1,209, making the total active membership 5,507. To this should be added an honorary membership of 1,961. The number of new associations added during the past year is 34. A total of 690 lectures have been delivered before the different associations, and 399 books—a number altogether too small—have been added to the libraries. This makes a total of only 1,809 volumes, or an average of less than twelve volumes to each association.

Steam Power of the World.

According to the Berlin Bureau of Statistics there are in the world the equivalent of 46,000,000 horse-power in steam engines, 3,000,000 being in locomotives. In engines other than locomotives the United States comes first, with 7,500,000 horse-power; England next, with 7,000,000 horse-power; Germany, 4,500,000 horse-power; France, 3,000,000 horse-power, and Austria, 1,500,000. Four-fifths of the steam engines now in operation are said to have been built within the last 25 years.

Newark Bay Improvements.

Lieutenent Derby, Corps of Engineers, U. S. A., has submitted his annual report upon the river and harbor improvements under his charge in New Jersey. A survey of Newark Bay disclosed the existence of another shoal about one mile below the one surveyed in 1884, about 800 ft. long and having a least depth of 8.06 ft. in the channel. It is not deemed advisable to extend the dyke beyond the length already constructed until positive evidence is obtained that the dredged channel across the shoal will not maintain itself alone. It is suggested that $100,000 can be profitably expended during the next fiscal year.

Sight-Feed Lubricators.

The Seibert Cylinder Oil Cup Co. calls attention to the fact that Judge Colt, of the Circuit Court of the United States, District of Massachusetts, has decided the lubricator case in favor of the company on its Gates patent. Judge Lowell also decided in its favor on the same patent Feb. 23, 1882. These decisions refer to the Gates patent method of lubricating the cylinders and internal working surfaces of steam engines, by oil fed in visible drops up through a liquid inclosed in a transparent chamber, called a sight feed.

Slack Gauge on a Sharp Curve.

The Utah & Northern between Pocatello and Silver Bow has been lately widened to the standard gauge. The sharpest curve on the changed portion of the road is situated in Bighole Cañon, and is 17 deg. (337 ft. radius). The gauge has here been made no less than 1¼ in. wide, to allow the passage of sleepers with six-wheeled trucks without excessive grinding.

THE SCRAP HEAP.

Argentine Affairs.

Herapath's learns that a large number of new railroad projects are being submitted to Congress, involving the construction of 4,000 additional miles. All the lines excepting extensions of the Rosario and Central Argentine lines a k government guarantees of from 5 to 6 per cent. on the cost of construction.

Congress has also taken up a project for a line of ten 5,000-ton steamers to run between Buenos Ayres and Lisbon in 14 days. The projectors ask a state guarantee of £100,000 per annum. This scheme has been sanctioned by the cabinet, and it is thought likely to be passed by Congress.

Caught a Receiver.

An evening newspaper startled the community the other day with these headlines: "A good haul by the police. Two burglars and a receiver caught." On reading further, however, it appeared that it was not that kind of a receiver.

Ever Faithful.

Orland H. Bronson, of Bridgeport, an engineer on the New York, New Haven & Hartford road, was accustomed to blow a whistle every evening to signal his wife that he was coming. Several years ago she died, but he never failed to blow a whistle in her memory as he sped past Mount Grove cemetery. He has since married again, and now he blows two whistles on his return home, one in low mournful tone in honor of his first wife, the other loud and cheery to tell his second wife that all is well.—*Exchange.*

Mr. Bronson runs engine 49 on local passenger trains. It appears that his late wife made a request that the signals be kept up after her death.

The English Collision.

A serious collision took place on the Midland Railway of England on Sept. 16. An excursion train loaded with people going to Doncaster to see the horseraces was standing on a crossing when the Liverpool express came at full speed around a curve and ran into it. The first carriage of the Liverpool train was telescoped. There were 28 people killed and 70 injured. The dispatches say that the disaster was caused by defective signaling, and that the block system had been abandoned for the day on account of the pressure of traffic, the trains being signaled by flags. The Midland Company admits its liability for the accident, and promises to deal liberally with the injured and the families of those killed.

Merry Texas.

Four armed men robbed the mail and express cars of the east-bound Texas & Pacific train on Sept. 20, near Benbrook, Tex., at the trestle over Marv's Creek. The same train was robbed on the same spot last June. The methods by which the train was stopped and robbed does not require repeated description. The leader of the gang is described as "a tall, thin, sandy haired fellow.' The usual postliminious posse is now working on that clue.

Hurrah for Dooly,

Fifty railroad ties, each 80 ft. in length and 6 by 10 in. thick, were cut from one pine tree of Dooly County, Georgia.

President Alexander's Car.

Down at the Central shops a handsome car is being built for the use of the President of the road. It will be a model of elegance and convenience when finished, and will reflect credit on the builders.—*Atlanta Constitution.*

Presidents' cars usually reflect more debit than credit.

A Deadhead's Paradise.

There is one free railraad in the world within the limits of a city. Those familiar with the Pacific Coast know that the city of Oakland is situated across the bay from San Francisco, very much as Brooklyn is situated toward New York. When Oakland gave the Central Pacific Railroad Company the right of way through its steets, the grant was made on the express condition that fare should not be charged within the city limits. The company has always acted up to this condition, even to the extent of admitting additions made to Oakland within the privilege. People for five or six miles get on and off the cars, and ride without money and without price. Naturally Oakland, which is one of the handsomest cities in California and, though within a couple of miles of San Francisco, is exempt from its terribly rasping summer winds, is increasing very rapidly in population. The railroad company finds that it is carrying an enormous number of passengers for nothing, and is looking for relief under the circumstances. Yet the people insist upon the bargain, and it is difficult to see how it can be broken without their consent.—*Boston Herald.*

Preferred Frank Stockton's Story.

Traveler (to paper-boy)—Here, gimme a *Century.*
Paper-Boy—Cut or uncut?
Traveler—Do they come both ways?
Boy.—Yep
Traveler—Then gimme one with the war articles cut out.—*Life.*

British Courtesy.

Among the engines which the London & Northwestern Company have recently built are three named after three of the presidents of the United States, "President Washington," "President Lincoln" and President Garfield."

RAILROAD LAW—NOTES OF DECISIONS

Powers, Liabilities and Regulation of Railroads.

A curious piece of legislation has been before the Supreme Court of Arkansas. A statute of that state provides that "if any section boss or master, hand, or other person employed by any railroad company owning and operating any railroad in this state, or any other person connected with any railroad in this state, shall be caught mutilating, disfiguring, burning, hauling off or burying any dead carcass that shall be killed on any railroad in this state, without first notifying at least two citizens of the neighborhood, whose duty it shall be to take and preserve all marks, flesh or ear or otherwise, or value of such animal, brute, swine, or other stock shall be deemed guilty of a misdemeanor, and be fined, etc." The Supreme Court holds it constitutional.[1]

In Connecticut in a suit to foreclose a mortgage made by the Connecticut Central Railroad Co. to the state treasurer as trustee, the New York & New England Railroad Co., which owned all the mortgage bonds, and at whose request the suit was brought, was made a co-defendant. The latter company had for some time had exclusive possession of the mortgaged property, under a lease which con-

tained an agreement to the effect that the net income derived from the property should be applied to the payment of the interest coupons, upon the nonpayment of which the foreclosure suit was based. The Connecticut Central answered that the New York & New England was the real plaintiff; that it was bound to account in this action for its receipts and expenses while in possession of the mortgaged property; and that on a just accounting it would appear that the net earnings had been enough to pay, and in equity had paid the defaulted coupons upon which the foreclosure was based. It was claimed by the New York & New England that it was in possession under the lease from the Connecticut Central; that the lease is a separate and independent contract from the mortgage; that it covers property not included in the mortgage; and that it provides for an arbitration in case of difference, and no arbitration has been had or asked. The Supreme Court of Errors holds: 1st. That the lease is not independent of the mortgage. 2d. That an agreement to submit to arbitration is invalid when its effect is to oust the courts of jurisdiction; and, lastly, that the New York & New England Railroad Co. must account as asked.[2]

In Michigan the Supreme Court holds that the "discharge lists" which it is the custom and duty of each division agent of a railroad company to send monthly to his fellow-agents to put them on their guard against men whom he has discharged, are privileged communications, and not libelous.

But where the reason given for the discharge of an employé is "sealing," and it appears that he was turned off because he had taken a good coat of a passenger from a train on which he was riding, and left his own, which was much worn, in its place, and that the investigation of his explanation, that he did it by mistake, while hurriedly leaving the cars at his station, was not fairly conducted, there is evidence tending to show express malice on the part of the company, which will render it liable in damages.[3]

In Dakota the Supreme Court rules that where a railroad corporation has construed the duties of its secretary to include a field of arduous work, not strictly within the ordinary interpretation of the functions of that office, the secretary can recover a reasonable compensation for the performance of such duties.[4]

In Mississippi the Supreme Court rules that a railroad or a steamboat company is not bound to transact business on the Sabbath merely because the statute permits it to be done; but if they hold themselves out to the public as so doing, and enter upon business which, according to their usages and habits, will be transacted on that day, they cannot shield themselves for either misfeasance or non-feasance because it was done or omitted to be done on the Sabbath.[5]

In Maine the Supreme Judicial Court rules that the Legislature has constitutional power to provide by statute that a railroad company shall build and maintain so much of a highway as comes within its limits where such way crosses its track at grade. Such a statute would not impair the obligation of any contract with a company, though its charter provide that it is not to be altered, amended or repealed.[6]

In Illinois, the Attorney-General asked for a writ of *mandamus* against a railroad company to compel it to repair and improve its road and increase the number of passenger trains. The company's answer showed that the road was out of repair, but it had no funds to put it in a safe condition. The Supreme Court rules that on this state of facts *mandamus* would be of no avail. The Court says: "If the travel and other business on the road, with one passenger train each way daily, have failed to keep the road in repair and pay running expenses, as is clearly shown to be the fact, it is difficult to perceive upon what theory the company, in its embarrassed condition, can be required to incur the additional expense of two extra passenger trains. A company that runs a daily passenger train each way over a road which cannot, with proper management, be made to keep up repairs and pay running expenses, certainly does fully as much as the law requires of it, so far as passenger trains are concerned. * * * * * To summarize what, perhaps, already sufficiently appears, we are of opinion that, upon the admitted facts of this case, the company is clearly guilty of a violation of its duty in not keeping its road in a proper state of repair and a safe condition; but that, under the circumstances, and for the reasons heretofore stated, *mandamus* is not the proper remedy for the enforcement of such duty. If, as seems to be the case, the defendant is wholly unable to discharge the duties it owes to the public, and which the law has imposed upon it, a proceeding in the nature of a *quo warranto* is the proper remedy, and not *mandamus*. Should the company by this means be deprived of its franchises, if the road can be made self-sustaining and pay something on the capital invested, doubtless another company would organize for the purpose of buying and operating it, and the advantages of the road under a proper management would be thus secured to the people. On the other hand, if the line of road is not capable under any management of being made self-sustaining, it simply shows there is no demand or necessity for the road, and the sooner, therefore, the state revokes the franchises the better. A business that will not pay ought not to be followed, as it adds nothing to the wealth of those pursuing it, or of the state."[7]

In Louisiana, the Supreme Court holds that the owner of lands who allows a railroad company to occupy and use the same for the construction of its road, and other appurtenances necessary to the operation of a railroad, without remonstrance or complaint, will be held to have acquiesced therein; and such a waiver will bar his action to dispossess the company. But such a waiver will not defeat his right of action for damages or for the value of the lands thus taken from him.[8]

In Iowa it is ruled by the Supreme Court that a mere interview by a committee of citizens who are desirous of having a railroad run through their town, with a property holder adjacent thereto, with the view of securing a gift of right of way through such property, and a subsequent tender by them of such right of way as they understood to have been donated by the property holder, does not, in the absence of positive proof to that effect, constitute the committee agents of the property holder so as to estop him from proceeding under the Iowa statute for land damages on the ground that the right of way which he had given was north of the barn and that which the railroad had taken was south of it.[9] In the same state the Supreme Court decides that owners of property abutting on a street in which a railway is constructed are not debarred from claiming damages by waiting until after the railway has been constructed, notwithstanding the provision of code Iowa, § 464, forbidding the laying down of any track in a street until after the abutters' damages have been ascertained and paid.[10] The same Court also holds that where a railroad takes and uses land outside its condemned right of way, it is necessary for the plaintiff, claiming damages for a permanent injury to the freehold, to prove an absolute freehold title in himself, and not merely possession, as in the case of trespass to a possessory right, and that it is not liable for the willful wrong of a subcontractor engaged in construction, in appropriating uncondemned land, unless it be proved to have authorized and assented to such wrong.[11]

In Minnesota, the Supreme Court holds that a railroad is not required to fence grounds needed and actually used for depot purposes, and required by public necessity and convenience to be left open; following former decisions. The statute requiring railroads to be fenced is not a law for line or partition fences, but a police regulation, the object of which is to *inclose* the roads so that cattle cannot get upon them; and when station grounds are required by public necessity or convenience to be left unincloased, a railway company owes no duty to the owner of abutting land to build a fence between his land and such station grounds.[12] In Iowa, it is ruled by the Supreme Court that if the fastening of a gate in a fence of a railroad's right of way is insufficient to keep the gate closed against cattle, it is a "failure to fence" within the Iowa code.[13]

Carriage of Goods and Injuries to Property.

In Maine the Supreme Court rules that it is not necessary that a notice from a consignor to a carrier not to deliver goods in transit to the consignee should state the grounds for the stoppage. But the carrier may afterwards request the consignor to furnish evidence of the validity of his claim.[14]

In Iowa a judgment debtor delivered certain household goods to a railroad company for shipment. A notice of garnishment was served upon the company, by reason of which the goods were detained about 16 days. The goods were exempt from execution, but of this neither the judgment creditor, the constable who served the notice, nor the railroad company had notice. As soon as such notice was received, the levy was released, and goods forwarded in reasonable time. The Supreme Court holds, in an action by the debtor against the judgment creditor, constable and railroad company for damages, that the plaintiff was not entitled to recover.[15]

In Iowa one E, doing business at Pueblo, Cal., ordered some canned goods of the plantiff, to whom he was unknown. Plaintiff delivered the goods to the defendant, a common carrier, consigned to himself, and received two shipping receipts. One receipt, indorsed to E, was attached to a draft upon E for the value of the goods, which was sent to a bank at Pueblo for collection. The other receipt was sent directly to E without an indorsement in writing by the plaintiff. E, upon presentation of the receipt received the goods from the defendant, who had no knowledge of the other receipt and draft. The Supreme Court holds that the possession by E of the receipt clothed him with such an apparent right to the goods as relieved the defendant of liability upon the refusal of E to pay for the goods and his subsequent insolvency.[16]

In Michigan a shipper delivered some goods, which he had taken under a chattel mortgage, to the defendant railroad for shipment. While in possession of the defendant, the goods were seized by the sheriff on an attachment against the mortgagors. Defendant gave notice of the seizure at once. The Supreme Court holds, in an action against defendant for not delivering the goods at the place of consignment, that, the attachment being regular, the seizure of the sheriff relieved the company of liability, although it did not appear that the writ of attachment was directed to be levied upon any specific goods in the hands of the defendant.[17]

A Texas statute provides that railroad companies and other common carriers shall not limit or restrict their liability, as it exists at common law, by any general or special notice, or in any other manner whatever, and that no special agreement in contravention of its terms shall be valid. Construing this statue, the Supreme Court holds that a contract between a railroad company and a shipper of live-stock which attempted to relieve the company of liability for all loss or damage, except such as arose from the willful negligence of its servants, and provided that, as a condition precedent to the shipper's right to recover damages for any loss, he should give notice in writing of his claim at a certain place, and in a certain time, was not valid. But a clause of a contract between a shipper and a railroad company, which limits the time within which a suit may be brought by the shipper, for any claim for damage arising under the contract to less than the time prescribed by the statute of limitations, does not limit or restrict the liability of the railroad company, within the meaning of the statute, and, if reasonable, will be enforced.[18]

In Mississippi the Supreme Court decides that where a contract for transportation of goods is made between a railroad company for itself, the warehouseman who is to receive the goods and deliver them to the connecting carrier, and the connecting carrier, on the one part, and the shipper, who has no knowledge of the tripartite agreement, on the other, the railroad company is not the agent of the shipper, and has no power to make a contract with the warehouseman that would relieve him from responsibility for its own negligence, resulting in loss of the goods by fire, or to bind the shipper by any contributory negligence of which the railroad company might be guilty in delivering the goods in an unsafe position in the warehouseman's yard.[19]

In Vermont it is ruled that an express company is not bound to transport intoxicating liquors, this being under the statutes of that state an offense. Where an express agent receives by express a package, marked C. O. D., containing intoxicating liquor, and, knowing its contents, delivers it to the consignee, collects the pay therefor, and transmits it to the consignor, he is liable to conviction under an indictment charging him with the illegal sale of such liquor; but when, in such case, he does not know the contents of such package, he is not liable, unless he had reason to believe or suspect what it contained.[20]

1 Bannon v. State, 4 S. W. Rep., 655.
2 Chamberlain v. Conn. Cent. R. Co., 4 New Eng. Rep., 477.
3 Bacon v. Michigan Cent. R. Co., 33 N. W. Rep., 181.
4 Edwards v. Fargo & S. R. Co., 33 N. W. Rep., 100.
5 Merchants' Wharf Boat Assn. v. Wood, 2 South. Rep., 76.
6 Boston & Maine R. Co. v. Commrs., 4 New Eng. Rep., 657.
7 O. & M. R. Co. v. People, 9 West. Rep., 167.
8 Lawrence v. Morgan's L. & T. R. & S. S. Co., 2 South Rep., 69.
9 Chicago, I. & D. R. Co. v. Estes, 33 N. W. Rep., 124.
10 Slouch v. Chicago & N. W. R. Co., 33 N. W. Rep., 149.
11 Wattemeyer v. Wisconsin, I. & N. R. Co., 33 N. W. Rep., 140.
12 Smith v. Minn. & St. P. R. Co., 33 N. W. Rep., 316.
13 Payne v. Kan. City, St. J. & C. B. R. Co., 33 N. W. Rep., 633.
14 Allen v. Maine Cent. R. Co., 4 New Eng. Rep., 543.
15 Hynds v. Wynn, 33 N. W. Rep., 73.
16 Weyland v. Atchison, T. & S. F. R. Co., 33 N. W. Rep., 133.
17 Pingree v. Detroit L. & N. R. Co., 33 N. W. Rep., 298.
18 Gulf, C. & S. F. R. Co. v. Trawick, 4 S. W. Rep., 567.
19 Merchants Warf Boat Asso. v. Wood, 2 South. Rep., 76.
20 State v. Goss, 4 New Eng. Rep., 518.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago & Eastern Illinois, annual meeting, at the office, Chicago, Ill., Oct. 4.

Eastern Illinois & Indiana State Line, special meeting, at the office, Chicago, Ill., Oct. 31.

Louisville & Nashville, annual meeting, at the office, Louisville, Ky., Oct. 15.

Minneapolis & St. Louis, annual meeting, at Minneapolis, Minn., Oct. 4.

Momence & State Line, special meeting, at the office, Chicago, Ill., Oct. 31.

Ohio & Mississippi, annual meeting, at the office, Cincinnati, O., Oct. 13.

Lake Erie & Western, annual meeting, at the office, Bloomington, Ill., Oct. 5.

Cumberland Valley, at the office, Harrisburgh, Pa., Oct. 3.

Housatonic, special meeting, at the office, Bridgeport, Conn., Oct. 5.

Minneapolis, Sault Ste. Marie & Atlantic, annual meeting, at the office, Osceola Mills, Wis., Sept. 29.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

General Time Convention, Hotel Brunswick, New York City, Oct. 12.

The *New England Railway Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

North American Railroad Superintendents, at the Hotel Brunswick, New York, beginning Oct. 10.

The *Brotherhood of Railway Brakemen*, National convention, at Binghamton, N. Y., beginning Oct. 19.

The *Brotherhood of Locomotive Engineers*, annual meeting, Central Music Hall, Chicago, Oct. 19.

The *Association of Railway Section Foremen*, annual meeting, Council Bluffs, Ia., Oct. 5.

The *Roadmasters' Association of America*, fifth annual Convention, Kennard House, Cleveland, O., Oct. 11.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Milwaukee & St. Paul, 3½ per cent. on preferred stock, 2½ on common stock, payable Oct. 14.

Nashville, Chattanooga & St. Louis, 1 per cent., payable Oct. 10.

Brotherhood of Locomotive Engineers.

A public meeting of the Brotherhood was held at the Boston Theatre, Boston, Sunday afternoon, Sept. 18, at which there were 3,500 people present. The state and Boston city governments were represented, and interesting addresses were made by Lieutenant-Governor Brackett, Grand Chief Engineer Arthur, Railroad Commissioner Kinsley, Congressman P. A. Collins and others. During the course of his remarks Mr. Arthur stated that since the benefit association was established $2,159,000 had been paid to the widows and orphans of deceased members of the Brotherhood.

President Charles P. Clark, and General Superintendent O. M. Shepard, of the New York, New Haven & Hartford, Vice-President William P. Shinn, of the New York & New England, and others, sent letters of regret.

Chief Arthur, in his address said among other things:

"It has been my privilege to meet nearly all the railway managers on this continent, and I want to say here that I have not met one within the past ten years who has not indorsed our brotherhood and approved of our course. * * * It takes time to acquire friends. * * * I want to speak of the policy of the brotherhood in dealing with disputes for the benefit of other labor organizations, some of whose members may be here to-day. I want to speak of our policy, and let them judge if it is not the best one. On all well regulated roads we have what we call a grievance committee. My advice is to select as members of that committee men of judgment, cool heads and clear brains, men who have been in the service of the company for years, and who are known to the officers of the road. I am sorry to say that my advice is not always followed. To that committee are referred the grievances of the men, after they have exhausted their own efforts to effect an adjustment with the company. The committee waits upon the officials of the road in rotation, beginning at the lowest grade. * * * By this policy we have settled every case except that of the Brooklyn Elevated. The officer of the brotherhood second in authority exhausted every honorable effort, but General Manager Martin refused to meet the men and discharged the grievance committee. I hold, notwithstanding his legal right to do that, he insulted the entire brotherhood. All that was left for the men to do was to quietly submit or leave the service of the company, or, in other words, 'strike,' if that word suits you better. The men struck and were whipped. These are the facts. When a general manager refuses to treat with his men and recognize their rights, he takes a position which is untenable, and he ought not to be sustained or retained in any position of authority upon a railroad. The solution of difficulties between employer and employed is in bringing the two parties together and having them sit down and talk the matter over."

National General Passenger & Ticket Agents' Association.

The semi-annual convention of this association was held in St. Paul, Minn., Sept. 20. There were about 200 members present. Fifteen new members were elected. The committee on uniform coupon tickets made a report, which was adopted, recommending that all single first-class coupon tickets be green, single trip second-class yellow, and single trip third-class salmon. It is recommended that round trip tickets be stone gray, and the backs of all tickets orange.

The meeting spent some time considering excess baggage rates, and divisions on the same, and passed a resolution in favor of issuing ticket rate sheets quarterly.

Resolutions of condolence on the death of the late C. R. Van Benthuysen, General Ticket Agent of the Albany Day line, were passed.

On Wednesday the members made excursion to various points of interest in the vicinity of St. Paul.

The next meeting will be held at St. Augustine, Fla., on the third Tuesday in March, 1888.

PERSONAL.

—A. C. Nash has resigned the position of General Freight Agent of the Natchez, Jackson & Columbus.

—Austin Gunnison has been elected Vice-President of the Safety Car Heating & Lighting Co., of New York.

—A. E. Sumner has resigned the position of Secretary to the President of the Lake Shore & Michigan Southern.

—Capt. Charles Dunlap has resigned the position of Superintendent of the Baltimore & Ohio lines in West Virginia.

—H. L. Cooper has resigned as General Master Mechanic of the Lake Erie & Western Company's shops at Lima, O. He will remove to Chicago.

—Henry W. Wynkoop, Superintendent of Telegraph of the Pennsylvania lines west of Pittsburgh, with headquarters at Crestline, O., died suddenly on Sept. 16.

—J. M. Quigley has resigned the Presidency of the Toledo, St. Louis & Kansas City. He is one of the largest security holders in the company. He took charge of the road six years ago when it was in a bad condition, and has succeeded in placing it on a paying basis. His management has been very successful throughout, and against the desires of the di-

rectors he has resigned in favor of his friend S. R. Callaway, who succeeds him as President of the company.

—S. R. Callaway, who was this week elected President of the Toledo, St. Louis & Kansas City road, resigned the position of General Manager of the Union Pacific last May. He has been in the railroad business for 21 years, serving on the Grand Trunk, the Detroit & Bay City, the Chicago & Western Indiana, the Detroit, Grand Haven & Milwaukee, and the Detroit & South Lyons. One contemporary calls him a "hustler." This is a complimentary term when applied to a railroad manager, and indicates that by never ceasing to progress; Mr. Callaway will perpetuate the growing prosperity of the Toledo, St. Louis & Kansas City. Half of this road is now changed to standard gauge.

ELECTIONS AND APPOINTMENTS.

Asheville & Tennessee.—The officers and directors are: President, S. R. Kepler; Vice-President, Natt Atkinson; Secretary and Treasurer, J. W. Courtland. Directors, J. H. Rumbough, L. N. Wells, C. E. Graham, S. R. Kepler, Natt Atkinson, M. J. Fagg, W. W. Barnard and J. W. Courtland.

Baltimore & Ohio.—J. F. Legge has been appointed superintendent of the Western Division, vice C. Dunlap, resigned. W. Alvey has been appointed General Agent at Washington, vice J. T. Legge, promoted.

Thos. C. Prince has been appointed Acting Superintendent of the Harper's Ferry & Valley Division, vice Mr. A. Gordon Jones, resigned.

Burlington & Missouri River.—The following appointments have been made on this road in Nebraska: C. B. Rodgers, Assistant Superintendent in charge of the lines, Atchison to Amboy, via Table Rock, Wymore to Crete Junction, and Odell to Concordia, with headquarters at Wymore. F. S. Granger, Trainmaster in charge of the lines, De Witt Junction to Holdrege Junction, Chester to Fairmount Junction, and Edgar to Superior Junction, with headquarters at Edgar. C. P. Philbrick, Trainmaster of the lines, Nebraska City to Salem, and Nemaha to Beatrice, and Roadmaster from Nebraska City to Salem, and Nemaha City to Tecumseh, with headquarters at Nebraska City. R. E. Hawley, Roadmaster of the lines, Edgar to Holdredge and Superior to Edgar, with headquarters at Edgar; J. Coughlin, Roadmaster of the lines, DeWitt to Edgar, and Chester to Fairmount, with headquarters at Strang. E. Bignell, Assistant Superintendent in charge of the lines, Aurora to Whitman, including Aurora Station, and Aurora North, also the Lincoln & Black Hills Railroad, with headquarters at Aurora. V. O. English, Trainmaster from Pacific Junction to Hastings, Ashland to Wahoo, and Oreapolis to Ashland, via Omaha, with headquarters at Lincoln. F. D. Houletta, Trainmaster from Nebraska City to Kearney, via Aurora, excepting yards at Lincoln, Aurora and Hastings, with headquarters at Lincoln; I. J. Belknap, Trainmaster in charge af all yard men at Lincoln, and all trainmen while on duty at Lincoln. J. R. Phelan, Assistant Superintendent in charge of the line, Holdrege to Cheyenne, with headquarters at Holyoke. C. H. Harman, Trainmaster in charge of the line, Denver to Kenehaw, with headquarters at McCook. B. V. Haley, Roadmaster, will be relieved of the line, Edgar to Holdrege, and will have charge of the line, Holdrege to Holyoke, with headquarters at Holdrege. Wm. Brown, Roadmaster, will be relieved of the line east of Holyoke, and will have charge of the line, Holyoke to Cheyenne, with headquarters at Cheyenne. L. B. Parsons, Roadmaster, will have charge of the Beaver Valley line, Orleans west, with headquarters at Orleans.

Canadian Pacific.—T. A. Mackinnon has been appointed General Superintendent of the Southeastern Division.

Cherokee & Dakota.—The incorporators of this new Iowa company are Edward T. Jeffery and John C. Welling, of Chicago, and William J. Knight, M. Gilleas, F. W. Quimby, J. Jacobs and William R. Palmer, of Dubuque, Iowa.

Chicago & Alton.—Frank Bowman has been appointed Traveling Passenger Agent, to take charge of business in New York and New England with the exception of New York City, Boston and state of Maine. Headquarters at Albion, N. Y.

Chicago & Calumet River Terminal.—The President is Alonzo Stephens; Secretary, James S. Prentiss. They are the directors with S. C. Gibbs, W. M. Wilson and E. T. Mason.

Chicago Freight Bureau.—N. G. Iglehart has been appointed Commissioner.

Chicago & Indiana Coal.—Walter H. Bremson, late Chief Train Dispatcher, has been appointed Master of Transportation, with headquarters at Attica, Ind.

Colorado Midland.—B. H. Bryant has been appointed Chief Engineer, vice T. H. Wigglesworth, resigned. Headquarters, Colorado Springs.

Concord.—M. T. Donovan has been appointed Assistant General Freight Agent.

Fall Brook Coal Co.—E. F. Kershner has been elected Traffic Manager to succeed H. A. Horning, deceased.

Hannibal & St. Joseph.—E. J. Swords having been transferred to other duties, Jas S. Bartle is made General Freight Agent.

Iowa Railway Commission.—W. W. Ainsworth has been appointed Secretary, vice E. G. Morgan, resigned.

Kentucky Central.—I. G. Rawn has been appointed Master of Transportation, with headquarters at Paris, Ky.

Lake Shore & Michigan Southern.—T. F. Whittelsey has been appointed Superintendent of the Kalamazoo division, vice M. E. Wattles, resigned.

D. F. Lillis has been appointed Secretary to the President, vice A. E. Sumner, resigned.

G. H. Prentice is appointed Division Roadmaster of the Cleveland and Erie division, with headquarters at Erie, Pa.

Los Angeles & Ocean.—The directors of this new California company are: C. E. French, of Santa Ana; G. W. Elwood, of Long Beach, and E. Bonton, M. L. Wicks, Jonathan Bixby, Edward Records, John W. Green, A. W. Barrett and A. W. Francisco, of Los Angeles.

Louisville, New Orleans & Texas.—P. R. Rogers has been appointed Assistant General Passenger Agent, with headquarters at Memphis, Tenn.

Michigan Northern.—Arthur Meigs is President.

Murfreesboro.—B. B. Winborne is President; E. F. Rice, Vice-President; and R. W. Winborne, Treasurer.

Natchez, Jackson & Columbus.—B. M. Brownell has been appointed General Freight Agent, vice A. C. Nash, resigned.

New York, Lake Erie & Western.—C. B. Dean has been appointed Traveling Agent.

New York & New England.—G. M. Farley has been appointed Engineer of Maintenance of Way, headquarters at Hartford, Conn.

New York, Pennsylvania & Ohio.—Washington Lavery has been appointed Master Mechanic at Galion, vice C. J. Clifford, resigned. D. S. Dockstader has been appointed General Foreman of Car Repairs, vice S. V. Smith, resigned.

Norfolk & Portsmouth Terminal.—William Green, New York, is President of this Virginia company. Myers Spicer, of Brooklyn, N. Y., is Secretary and Treasurer.

Northern Pacific.—The following directors were elected last week: August Belmont, Frederick Billings, John U. Brookman, Benj. P. Cheney, Robert Harris, Brayton Ives, Thos. F. Oakes, Chas. B. Wright, Henry Villard, Edwin H. Abbot, Chas. L. Colby, Colgate Hoyt, John B. Trevor. The new board elected the former officers.

Oneonta & Otsego Valley.—The directors of this New York company are: Sidney Dillon, Arthur W. Soper, William R. Thomas, New York; George Foster Peabody, Edwin Packard, Joseph A. Davidson, A. P. D. Burden, R. F. Pearsall, Samuel A. Meeks, Brooklyn; J. B. Skehan, Upper Montclair; H. M. Morris, David Wilber, Oneonta.

Pasadena, Los Angeles & Long Beach.—The directors of this new California company are: John W. Green, O. J. Johnson, F. A. Atwater and W. Walker Ross, of Los Angeles, and G. W. Glover, of South Pasadena.

Pennsylvania.—J. P. Hale has been appointed Engineer of Maintenance of Way, vice G. M. Farley, resigned.

Port Townsend & Southern.—The incorporators of this new company are Henry Landes, N. D. Hill, R. W. DeLion, Thomas Jackman, Robert C. Hill, Lote B. Hastings and H. E. Morgan, of Port Townsend, Wash. Ter.; Benjamin Lilienthal, S. W. Levy, B. Stienman, Lewis and A. W. Moore, of San Francisco.

St. Paul, Minneapolis & Manitoba.—P. P. Shelby has been appointed General Manager of the new Montana line of this company.

Santa Domingo Central.—The officers of this company are: Horatio C. King, President; George G. Ward, Vice-President; James E. Coleman, Secretary; Philip P. Harris, Treasurer, all of New York.

Toledo, St. Louis & Kansas City.—S. R. Callaway has been elected President, in place of J. M. Quigley resigned.

Wabash Western.—W. E. Ostrander has been appointed Traveling Agent, with headquarters at Denver, Col., vice W. J. Shotwell, resigned.

Wisconsin Central.—John Player has been appointed Superintendent of Motive Power, to succeed H. A. Barnes. Thomas Clifford has been appointed Superintendent of the St. Paul Division, vice C. F. Waldo, who is transferred to the Middle Division, with headquarters at Stevens Point, Wis. P. Walling, who is now Superintendent of the Middle Division, will take charge of the Bridge Department.

OLD AND NEW ROADS.

Alabama Midland.—The Alabama Terminal Railway Co., J. W. Woolfolk, 7 Nassau street, New York, President, has the contract to build this road, 170 miles in length.

Apopka, Clay Springs & Gulf.—This company is being formed in Apopka, Fla. The capital stock will be $300,000.

Arizona Mineral Belt.—The road is completed 36 miles from Flagstaff, Ariz.

Asheville & Tennessee.—This company has organized in North Carolina. The proposition is to build a road from Asheville, N. C., to some point on the Tennessee line, where it will connect with some road to Knoxville, Tenn.

Atchison, Topeka & Santa Fe.—The company has leased the right to run over the tracks of the Chicago & Grand Trunk from Forty-ninth street to Western avenue and Twenty-sixth street in Chicago. A memorandum of sale, a deed of conveyance and a lease have been filed. The sale is made by the Grand Junction Railway Co., which company agrees to sell 1,207 ft. of land to the Atchison Company in A. D. 1935, for the sum of $1,300,000. In the meantime the Atchison uses this property and pays 6 per cent. interest for it. The Chicago & Grand Trunk files the deed of conveyance on the right of way as above mentioned, reserving the right to run its own trains over the tracks. The Grand Junction makes the lease. It is for property in the vicinity of Halstead and Forty-ninth street, and is made for a term of 99 years at $18,000 a year.

The company has formally notified the proper authorities at Chicago that it will begin track-laying in that city at once, in pursuance of its recently acquired franchise. Some real estate speculators are trying to compel the company to pay exorbitant prices for property, and one of these, C. W. Rigdon, has already begun action in the courts for that purpose.

This company, with the Denver, Texas & Fort Worth and the Missouri Pacific, will build a union depot at Pueblo, Col., to cost $150,000.

This company's new line from Los Angeles to Santa Ana, Cal., will run through the town of Whittier, and a branch will be built to Wilmington.

Atlanta & Hawkinsville.—D. H. Visscher, of Fort Valley, Ga., has received the contract to build this road from Knoxville to Fort Valley.

Atlantic & Pacific.—It is reported in Sacramento, Cal., that the company will build to that city. Surveyors are now at work on the line from Mojave. The road, it is said, will go by the way of Stockton. This would be a long stretch of road—over 300 miles—and the Sacramento surmisers may possibly be indulging in a corresponding stretch of the imagination.

Blountsville Land Co.—This company, of Blountsville, Ala., will build a road from Blountsville to Bangor, 12½ miles. Dr. F. N. Hudson is President.

Buffalo, New York & Philadelphia.—The road was sold in Pittsburg, Pa., on Sept. 15, in pursuance of an agreement of reorganization between the bondholders and stockholders of the company dated Feb. 15, 1886. The company went to default in May, 1885, and on the 20th of that month G. Clinton Gardner, President of the company, was appointed Receiver. A Committee of Reorganization was appointed in the city of New York, consisting of the Hon. Carl Schurz, C. H. Clark, C. N. Frye, I. N. Seligman, and T. H. Adrain Tromp. Committees were also appointed in Amsterdam and Franklin.

The recognized company includes the old Oil Creek Union Titusville; Pittsburgh, Titusville & Buffalo; Buffalo, Pittsburgh & Western; the Warren & Franklin; the Buffalo, New York & Philadelphia road and its narrow gauge system, and extends from Buffalo and Rochester in the state of New York to New Castle, Oil City, and Emporium, in Pennsylvania. The total mileage of the road is about 635 miles, and the amount bid for the property at the sale was $1,900,000. The New York property was sold last week. It will be necessary to organize two separate companies under the laws of the two states, and these will then consolidate under the name of the Western New York & Pennsylvania Railroad Co. The reorganized company will create a first mortgage not to exceed $10,000,000.

Burlington & Missouri River.—This company announces that its road in Nebraska is divided as follows:

Northern Division, in charge of D. E. Thompson, Superintendent, Lincoln, Neb., includes the lines Pacific Junction to Kearney; Oreapolis to Ashland, via Omaha; Ashland to Wahoo; Nebraska City to Whitman; and Hastings to Greeley, via Aurora.

Southern Division, in charge of J. McConniff, Superintendent, Lincoln, Neb., includes the lines Atchison to Columbus; Table Rock to Amboy; Nebraska City to Salem; Nemaha to Beatrice; DeWitt to Holdrege; Crete to Wymore; Chester to Fairmont; Superior to Edgar; and Odell to Concordia.

Western Division, in charge of A. Campbell, Superintendent, McCook, Neb., includes the lines Kenesaw to Denver; Hastings to Oxford, via Red Cloud; Holdrege to Sterling; Republican to Oberlin, and Orleans southwest.

Canadian Pacific.—This company has assumed the operation of the Southeastern Railway of Canada, and it will hereafter be operated as the Southeastern Division of the Canadian Pacific. The line of road extends from West Farnham, Que., to Richford, 44 miles; from Sutton Junction to Sorel, 96 miles; from Drummondville to L'Avenir, 12 miles; and with a leased mileage of 128 miles; a total mileage operated of 280 miles. The section of the Canadian Pacific between Montreal Junction and West Farnham, including the St. Lawrence bridge, will be operated as part of the Southeastern Division.

Careyville, Jacksboro & Big Gap.—This company has filed a charter in Tennessee.

Carolina, Knoxville & Western.—The county of Sevier, Tenn., voted this week to subscribe $75,000 to this company. Knox County will vote next month on a proposition to subscribe $100,000, and there will be no opposition, it is said.

Central Iowa.—The sale of the Eastern Division and of the branches of this road took place at Marshalltown, Ia., last week. They were bought by James Thompson, of New York, for the reorganization committee. The Eastern Division brought $550,000, and the branches $400,000. The main line will be sold on Sept. 28.

Central Massachusetts.—The large iron bridge at Bondsville, Mass., is completed and trains are running over it.

Central of New Jersey.—The company filed a mortgage of $50,000,000 with the Central Trust Co. of New York this week. The purpose of the mortgage is to raise funds to pay off bonds, aggregating $40,393,750, and other liabilities. The mortgage bears 5 per cent. interest, payable in gold, and is not to run over 100 years. Among the bonds to be taken up are the first mortgage bonds of December, 1868, for $5,000,000; consolidated bonds of September, 1874, for $15,000,000; bonds issued November, 1872; adjustment bonds of May, 1878; convertible debenture bonds of September, 1883; Newark & New York Railroad, Car Trust Association, Long Branch & New Jersey Southern and Long Branch & Seashore Railroad bonds.

Cherokee & Dakota.—Articles of incorporation filed in Iowa. The proposed road will extend southwestwardly and northwestwardly from Cherokee, Ia., through Iowa, Nebraska, Minnesota and Dakota. Capital stock, $4,000,000. Principal office, Dubuque, Ia.

Chesapeake, Decatur & New Orleans.—Surveys are being made on this road between Shelbyville, Ky., and Murfreesboro, Tenn.

Chicago, Burlinton & Quincy.—The company is making a survey from Beardstown to Camp Point, Ill.

Chicago & Calumet River Terminal.—Under this name articles of consolidation have been filed in Indiana, by the Calumet River, the Hammond & Lake Michigan and the Chicago & Calumet Terminal railroad companies. These lines, either projected or built, form a part of the system of belt roads that are to encompass Chicago, and include that part in the state of Indiana. Capital stock, $5,000,000.

Chicago, Kansas & Nebraska.—The line was opened to Kansas City, Mo., on Sept. 18, with two trains daily between St. Joseph and Kansas City.

Chicago, Milwaukee & St. Paul.—The new bridge over the Missouri at Randolph, Mo., will be completed next week. The track of the company's extension is laid to within 21 miles of Kansas City, and is being laid at the rate of about a mile a day.

A preliminary survey has been made for a line from Cedar Falls, Dunn County, Wis., to Superior City.

Chicago & Northwestern.—The final survey of the extension of this road to Champion, Mich., is nearly completed, and in several places along the line grading is well under way. A great deal of difficulty is experienced in getting enough men to keep the work progressing as fast as is desired.

R. B. Langdon & Co., of Minneapolis, have 1,200 men at work on the extension of this road from Ispheming, Mich., to Champion. Grading will be completed by Nov. 1, and it is expected that trains will be running by Jan. 1.

Chicago, Rock Island & Pacific.—The company has announced a new issue of 41,960 shares of stock, $4,196,000 par value, an increase of 10 per cent. in the share capital. Stockholders have the privilege to subscribe to the new stock on or before Oct. 15, and payments must be made on Nov. 1. The directors say in their circular that the money is to be used in the extension of lines, for further improvement and construction, and to increase facilities.

The company has just completed a yard with six tracks, with a capacity for holding 500 freight cars, in St. Joseph, Mo.

Cincinnati, Hamilton & Dayton.—The receivership case was continued this week in Dayton, O. Vice-President C. C. Waite's testimony developed the fact that the purchase of the Louisville, Cincinnati & Dayton road was consummated in May last, when Henry S. Ives was in Middletown, the purchase price being $250,000, of which $10,000 was paid down in cash, and 4 per cent. bonds were issued for the balance. The statement of the press that this purchase had been made was denied at the time by the Cincinnati, Hamilton and Dayton people. All rumors as to a compromise

between the company and George K. Duckworth, the applicant for the Receiver, are groundless.

Fire destroyed several buildings belonging to this company at Lima, O., on Sept. 20. Loss, $50,000.

Cincinnati, Jackson & Mackinac.—This company will build a branch from Allegan to Saugatuck, Mich., provided right of way, depot grounds, water front and $60,000 are donated. An earnest effort to secure the funds is now in progress.

Clearwater & Tampa.—This company has been organized in Florida.

Cleveland & Wheeling.—The stockholders have voted to increase the capital stock to $1,500,000, and to mortgage the road for the same amount for the purpose of securing money with which to locate, construct and equip it. The line, as contemplated, is an extension of the Cleveland & Canton, from the terminus of its Carrollton branch at Sherrodsville, Carroll County, O., to Wheeling, W. Va. When completed it will give the Cleveland & Canton a through line from Lake Erie to the Ohio River.

Columbus, Lima & Northwestern.—Contracts for grading this road between Lima and Columbus, O., will be let at once. B. C. Faurot, of Lima, is President.

Denison, Bonham & New Orleans.—The survey has been completed between Bonham and Cooper, Tex., via Ladonia, and work will commence on this part of the road at an early day. The grading and the bridges between Denison and Bonham are about completed.

Denver & Rio Grande.—The company will open the line to Glenwood Springs, Col., next week. Grading is finished from there to Aspen, and tracklaying will be continued toward that point at once.

Detroit, Essex & Lake Erie.—At a meeting in Essex, Ont., last week, it was decided to organize and construct a line from London, Ont., to Detroit, Mich., 110 miles. It is said that this will be the Detroit line of the Canadian Pacific, and it is expected to be built at once. The work would all be easy, as the country is level.

Duluth & Iron Range.—The company has filed an amendment to its articles of incorporation changing the limit of indebtedness to $2,000,000.

Duluth, South Shore & Atlantic.—This road was completed last week from Sault Ste. Marie, Mich., to a junction with the Detroit, Mackinac & Marquette, which road is a part of the system. With the Marquette, Houghton & Ontonagon, also part of the system, Sault Ste. Marie is put in close connection with the outside world. At the arrival of the first engine at Sault Ste. Marie a 21-gun salute was fired from Fort Brady, the cymbals crashed and the trumpets brayed, and vast crowds hurrahed while they are said to have drunk champagne.

East Liverpool, New Lisbon & Southern.—This road is to be built from New Lisbon to East Liverpool, O.

Eastern Barnwell & Western.—A bill will be introduced in the next session of the South Carolina Legislature to charter a road by this name, to extend from a point at or near Charleston to some point on the Savannah River, between Edgefield and Hampton counties.

Elmira, Cortland & Northern.—This road has been extended from Canastota, N. Y., north, via Lakeside, Oneida Creek, Sylvan Junction, Vienna and McConnellsville to Camden, N. Y., 20 miles.

Fairchance & State Line.—This line will extend from Fayette County, Pa., to Rolsburg, W. Va., where connection will be made with the Baltimore & Ohio. Some of the best timber and coal land in West Virginia will be opened up by the road.

Fitchburg.—The company has made a report to the Railroad Commissioners, the first since it absorbed the Troy & Boston and the Boston, Hoosac Tunnel & Western roads. The statement is for the quarter ending June 30:

Gross earnings	$1,277,651
Operating expenses	901,626
Other income	19,854
Charges	276,144
Net income	119,735

This is the balance sheet:

ASSETS.

Cost of road, etc	$26,470,671
Stocks and bonds	117,020
Other permanent investments	2,714,177
Due by agents	483,779
Due by others	197,655
Due by companies, etc	241,647
Supplies on hand	569.6 8
Cash	254,471
Other investments	9,375,065
Total	$40,424,175

LIABILITIES.

Capital, common	$7,000,000
Capital, preferred	13,770,600
Funded debt	16,540,600
Loans and bills	1,605,300
Interest on funded debt	178,279
Dividends unpaid	16,969
Due for wages, etc	390,213
Due companies	555,889
Profit and loss surplus, current year	218,320
Surplus June 30	145,002
Total	$40,424,175

The company has obtained writs of certiorari to compel the assessors of the towns of Hoosick, Pittstown and Schaghticoke, N. Y., to reduce the assessed valuation on its property from $30,000 to $10,000 per mile.

Fort Worth & Denver City.—The track is laid to a point 346 miles from Fort Worth, Tex., and about 25 miles from Tascosa, in Oldham County.

Fremont, Elkhorn & Missouri Valley.—Tracklaying on this road is expected to be completed from Rapid City, Dak., to Sturgis by Oct. 1.

Georgia, Southern & Florida.—There are 1,000 men at work on this road between Macon and Valdosta, Ga. It is expected to have a train running by Nov. 1.

Georgia.—The Georgia Legislature has been asked to incorporate the following railroad companies. The Chattanooga Eastern; the Lexington Terminal, to build from Crawford to a connection with the projected Augusta & Chattanooga; the Thomasville & Northern, to build to the Florida line, also to a connection with the Georgia Central; and the Great North & South, which proposes to build from Atlanta to the South Carolina line.

Gulf, Colorado & Santa Fe.—The road will be completed to Weatherford, Parker County, Tex., early in November.

Hudson's Bay.—The projectors of this road have issued a pamphlet in which it is claimed that 100 miles of the road will be completed and in operation before the close of the present year, from Winnipeg Man., nearly to Fairford, on the Little Saskatchewan.

Illinois Central.—The company is improving its recently acquired line between West Lebanon, Ind., and Le Roy, Ill. The track between Rantoul and West Lebanon has been widened to standard gauge, and the west end between Rantoul and Le Roy will be changed as soon as possible.

Jacksonville Southeastern.—The Centralia, Ill., extension of this road is now ready for tracklaying.

Jellico & Cumberland Gap.—The company has filed a charter in Tennessee.

Kansas City & Pacific.—The road has been extended from Grant Centre, Kan., north to Moran, 16 miles.

Kansas City, Watkins & Gulf.—The road will soon be in course of construction. It is projected as a through line from Lake Charles, Calcasieu County, La., to Kansas City, Mo.

Knox & Lincoln.—The company has appointed a committee of directors to consider an extension from Rockland to Camden, Me.

Lake Shore & Michigan Southern.—The Sharpsburg branch has been completed from Doughton, O., east to Sharon, Pa., 7 miles.

Little Rock & Alexandria.—President B. W. Johnson informs the Mayor of Alexandria, La., that he has perfected all arrangements to construct the road, and that as soon as the citizens of that place decide about donating the 30 acres of land and the 5 mill tax for ten years, he will commence at once the construction of the bridge near the town.

Los Angeles & Ocean.—Articles of incorporation filed in California. The length of the road is 22 miles. Capital stock of company $350,000.

Louisville & Nashville.—A report was telegraphed to the daily press this week stating that this company had filled the city of Nashville, Tenn., with Pinkerton detectives for the purpose of having them dog the employés of the Louisville & Nashville on Sept. 22, to see that they vote against the proposition to subscribe $500,000 to the Tennessee Midland road. The assertion made in the dispatches has been denied. The officers of the Louisville & Nashville and Pinkerton's Chicago agency pronounce it entirely false.

Serious washouts, causing long delays, occurred this week on the road between Michaud and Chef Menteur, La.

Louisville, New Albany & Chicago.—The roundhouse and machine shops of this company at Michigan City, Ind., were burned on Sept. 18.

Louisville, New Orleans & Texas.—It is reported that the company will build a branch from Lula, Miss., to a point opposite Helena, Ark.

Marietta & North Georgia.—For the third time the Georgia Legislature last week refused to pass the bill authorizing the changing of the southern terminus of this road from Marietta to Atlanta, Ga. The rural members have all along attacked the bill, urging that the extention of the road would take away business from the Western & Atlantic, which is owned by the state. The project for building was in the hands of Northern capitalists, headed by R. M. Pulsifer, of the Boston *Herald*.

Massena Springs & Fort Covington.—The contract for building this road has been let to Rogers & Taylor, Montreal. The line will connect the Montreal & Champlain Junction Division of the Grand Trunk with the Rome, Watertown & Ogdensburg road, and will be constructed at once.

Mexican National.—Eight carloads of grading outfit left Laredo, Tex., this week to begin work on the gap in this road between San Luis Potosi and Saltillo. The line will probably be completed to the City of Mexico within a year.

Michigan Northern.—Incorporated in Grand Rapids, Mich. Capital stock, $400,000.

Milwaukee & Northern.—This company has taken the Menominee & Republic in by consolidation. By so doing it obtains a continuous line from Milwaukee, Wis., to Republic, Mich.

Minnesota & Northwestern.—This company has this year completed three separate surveys of a line from Minneapolis and St. Paul, Minn., to Superior City, Wis., which it proposes to build next year. The line selected is of easy grade and the shortest possible. It is reported that the company will also build a line into Dakota, branching from the Superior City line at Mille Lacs, Minn.

Missouri Pacific.—The Pacific Railway of Kansas has filed articles in Nebraska consolidating with the Pacific Railway of that state. The road as consolidated will extend from Warwick, Kan., to Hastings, Neb. It is a branch of the Missouri Pacific.

The company announces the opening of the Taylor, Bastrop & Houston, running from Taylor to La Grange, Tex., 17 miles; also its Nebraska City Branch from Auburn to Weeping Water, Neb., 46½ miles.

Montgomery & Florida.—The road has been extended from McLaren's Mills, Ala., south to Live Oak, Fla., 10 miles.

Murfreesboro.—Chartered in North Carolina. The proposed road will run from the Roanoke & Tar River road, which is virtually a branch of the Seaboard & Roanoke, to the Meherin River at Murfreesboro. Capital stock, $50,000.

Napa, Lake & Humboldt.—Work will immediately begin on this road. Lake County, Cal., has just subscribed the $75,000 required and Napa County guarantees a like amount.

Nashville, Florence & Sheffield.—The company has made a mortgage to the New York Central Trust Co. for $2,500,000, for the completion of the road and branches, and to pay the bonded and floating debts.

Nashville & Knoxville.—Work is rapidly progressing on this Tennessee road. A large force has been put to work at Lebanon to meet the force working from Watertown, and it is probable the grading will be finished to Gordonsville by the middle of October. Thirty-six miles of steel rails have been purchased in Pennsylvania; and they will be delivered at once.

National City & Otay.—The American Bridge Building Co., of San Francisco, have contracted to grade and bridge the extension of this road from National City, Cal., up the Sweetwater River.

New Roads.—The construction of a line from Batesville to Melbourne, Ark., *via* Barren Fork and Lacrosse will be begun within a few days. The money to build and equip it has all been subscribed.

A contract has been let for building a road between Boulder and Red Bluff, M. T.

A new road is building in the state of Chihuahua, Mex., from the Mexican Central line to the great mining camp of Parral, and probably beyond to the Sierra Madre. Ground has just been broken a few miles from the town of Jiminez. H. A. Case is Chief Engineer.

Thomas Wardell, a coal operator of Bevier, Mo., is making preparation to build a road from Summit, 3 miles west of Macon, Mo., to Salisbury or Clifton, a distance of 32 miles

New York Railroad Commission.—The State Board of Railroad Commissioners met at the Fifth Avenue Hotel, New York, this week. The accident of Monday evening (a collision between a passenger train and a switch engine) on the Brooklyn Elevated Road was discussed, and the Board decided to begin an investigation. A communication from Watson H. Brown, President of the Buffalo, Rochester & Pittsburgh was laid before the Board announcing the withdrawal of the company's application to increase its capital stock from $12,000,000 to $13,000,000. This application was made in June and the report of S. Y. Southard, the assistant accountant of the Board, had been made and sent in. It is understood that the report of Mr. Southard was adverse to the granting of the application.

The Commission has experienced some difficulty in enforcing that section of the act of 1869 which requires railroad companies to file a separate statement of the cost of operating their leased lines. When the Board came into existence in 1882 the requirements of this act appear to have been overlooked and the blanks necessary for executing it were not prepared until a few months ago. As a consequence but few companies operating leased lines have complied.

Norfolk & Portsmouth Terminal.—The company has been organized in Portsmouth, Va. Capital stock, $100,000.

Norfolk & Western.—The company will build machine shops at Burkesville, Va.

Northern Pacific.—A bill in equity has been filed in Wyoming for an accounting between this company and the United States for timber cut from government lands. The amount claimed by the government is $2,000,000, and a perpetual injunction is demanded which will prevent further depredations. The attorney claims that the license to cut timber expired by law in July, 1879.

Ohio & Mississippi.—A dispute has arisen at Altamont, Ill., between this company and the Wabash. The two roads use the depot at that place together, and the Wabash uses the Ohio & Mississippi's tracks to get to the depot. On Sept. 20 the latter company placed an engine on the track where the roads connect, with a force of men to prevent the Wabash people from getting through. Receiver McNulta intends, if the obstruction is continued, to call on the United States Courts for assistance.

Oneonta & Otsego Valley.—Incorporated in New York to build from Otsego to Oneonta, a distance of 28 miles.

Oregon Pacific.—Tracklaying to the Santiam River, 9 miles east of Albany, Ore., is finished. Nelson Bennett's contract for grading 40 miles east of Albany will be completed and ready for tracklaying inside of a month.

Pacific.—The Pacific Railway Commission resumed its session on Sept. 20 at 10 Wall street, New York. Charles Crocker, Second Vice-President of the Central Pacific, was the only witness of the day. On Sept. 21 Collis P. Huntington, First Vice-President of the Central Pacific, was examined.

Pacific Coast.—Fully 1,000 men are at work on the extension of this road in San Luis Obispo County, Cal. Fifteen miles of track have been laid south of Los Alamos, and it is said the terminus of the road will be in the Gaviota Pass. It is thought that this road is either already in the control of the Southern Pacific or will be soon.

Pasadena, Los Angeles & Long Beach.—Articles of incorporation filed in California. The purpose is to build a road from Pasadena to the sea shore at or near Long Beach, an estimated distance of 25 miles. Capital stock, $1,000,000.

Pensacola & Memphis.—It is reported that work is to begin on this road. The line is projected from Grenada, Miss., southeast to Meridian and thence to Pensacola, Fla. L. H. Sellars is President.

Philadelphia & Reading.—Employés of this company have formed an Inter-state Trade Assembly and will apply for a charter this week. It is intended to comprise all the miners and railroad men in the employ of the company. Arbitration will be made a principle of the organization.

Richmond & Danville.—Contracts have been given out by this company to build a road from Oliver Springs to Clinton, Tenn.

St. Louis, Iron Mountain & Southern.—The Memphis branch of this road has been completed and opened for business from Bald Knob to Wynne, Ark. The track has been laid much further toward Memphis, and it is expected to have the road completed within 60 days.

St. Louis, Kansas City & Colorado.—The company will within 30 days let contracts for the construction of 426 miles of road to small contractors. S. T. Emerson, St. Louis, is Chief Engineer and Superintendent.

St. Louis, Arkansas & Texas.—The contract for the construction of the Little Rock Branch of this road, which is held by McCarthy & Kerrigan, is progressing rapidly and the indications are that trains will be running into Little Rock by Dec. 1. Byrne & Fitzpatrick, who are building 15 miles east of Little Rock, will finish their work in three weeks. The bridge contract, including trestles, has been awarded to F. H. Hicks.

The survey of the St. Louis extension, which has been in progress under Division Engineer S. C. Martin since February, is completed, and construction will now begin.

St. Paul, Minneapolis & Manitoba.—The branch from Benson, Minn., to Watertown, D. T., 91 miles, was opened for business on Sept. 19.

Santa Monica Outlook.—The company has filed articles in California. The proposed road is to run from Santa Monica to the ocean, thence to the old Santa Monica Cañon, 4 miles. Capital stock, $40,000.

Santo Domingo Central.—This company, incorporated in New York, and which has a concession from the Dominican government for a railroad across the island in a general northerly direction from the port of Barahona, will soon begin construction. The first objective point is Salina, twenty miles from the coast, where are inexhaustable deposits of pure salt; the Neyba salt mountain, which is a solid mass of crystal salt, weighing 90 million tons, being owned by the New York & St. Domingo Rock Salt & Improvement Co.

The island also produces logwood, fustic, cabinet woods, and other valuable timber, as well as bananas, coffee, etc., from which the company expects considerable traffic, contracts for some of it being already virtually closed. The capital of the company is $2,000,000, and its concession provides for a land grant of every alternate section of 16 square miles on both sides of the road. The northern terminus is Manzanilla, on the northern coast, about 150 miles from Barahona. The grade from the coast to the salt mountain is easy, and the estimated cost of construction of that portion is only $10,000 per mile. Contracts for this and for a section from Manzanilla inland have already been let. The gauge of the road is to be 3 ft. 6 in. and the rails 46 lbs. per yard. It is said that the company is now considering proposals for rolling stock and rails. Mr. A. L. Fowler is the engineer in charge of the work, and the New York office is at 32 Liberty street.

Seattle, Lake Shore & Eastern.—The management of this road in Washington Territory announces that at least fifty miles of road will be built this year. Work on the next 40 mile section begins immediately.

Somerset.—The company is building at Oakland, Me., a repair shop 150×40, also a blacksmith shop 40×30 and several smaller buildings for storing supplies.

Southern Pacific.—The road was again damaged by washouts this week. They occurred at Indo, Ariz., and between Taona and Yuma. Trains were delayed two days.

The company now has about 2,000 men at work in its shops at Sacramento, Cal. They are now building 200 fruit cars, 60 of which are nearly completed. The cars will be 6 ft. longer than the present ones. All the old "silver palace" cars, the first sleepers used by the company, have been taken off the road and replaced by the Pullmans. The old cars are being made into day coaches. Five passenger and 13 freight locomotives are being built. Some cars are being built for the company's new line between Ashland and Portland.

Southern & Western Air Line.—It is proposed to build this road from Shelby, N. C., via Morganton, to Cranberry on the East Tennessee & Western North Carolina road. The survey is in progress.

Texas & Pacific.—The plan of reorganization has been modified as follows: The interest on new first-mortgage bonds shall begin June 1, 1888, and first coupon payable Dec. 1, 1888. As compensation the holders of each consolidated 6 per cent. mortgage bond on the Eastern Division receive 115 35-100 per cent. in the new first-mortgage bonds instead of 112 per cent. Holders of each New Orleans Pacific bond receive 61 81-100 per cent. in new first-mortgage bonds instead of 60 per cent. The holders of Rio Grande Division bonds receive 41 20-100 per cent. in new first-mortgage bonds instead of 40 per cent. as in said agreement provided. The holders of Terminal bonds receive 25 75-100 per cent. in new first-mortgage bonds instead of 25 per cent.

Toledo, Ann Arbor & North Michigan.—This company will build shops at Owosso, Mich. Work will begin within 30 days.

Toledo, Peoria & Western.—The road has filed with the State Railroad & Warehouse Commission a report of the Chatsworth accident. It says nothing of the circumstances under which the train was wrecked, but estimates from the number of tickets sold that there were 540 persons on the train, of whom 80 are now dead. The number injured is given as 151, 10 of whom were employés of the road. Nine employés and 102 passengers have recovered from their injuries, and 39 are still under the care of physicians. Three or four are not free from danger or fatal results.

Toledo, Saginaw & Muskegon.—Work on this road progresses satisfactorily. It is in the hands of New York parties. The line is to run from Ashley, on the Toledo, Ann Arbor & North Michigan road, to Muskegon, Mich., 95¼ miles. The entire grading and bridging is completed, the ties are all delivered and 17 miles of track is laid from Ashley westward, while the rails are delivered at Ashley to complete 33 miles more. Deliveries of rails, at Muskegon, to be laid eastward, will soon begin, insuring an early completion of the entire line.

Tombigbee.—This company, that will build a road from Columbus, Miss., to Decatur, Ala., 130 miles, expects to let its contracts at an early day.

Vincennes, Oakland City & Owensboro.—This company, whose incorporation has already been reported, will build a road from Vincennes, Ind., to Owensboro, Ky.

Wabash Railway.—Receiver McNulta has issued his report for August. A recapitulation shows the following: Cash on hand July 31, $655,975; receipts in August, on accounts prior to April 1, $8,849; receipts on current account, $1,008,538; total, $1,663,363; disbursements on accounts prior to April 1, $19,900; on current account, $759,048; total, $788,948; cash on hand Aug. 31, $884,415.

Wabash, St. Louis & Pacific.—The Court has handed down its decision on the question of compensation for the Receivers of this company. The Master, Edmund T. Allen, recommends an allowance of $112,500 each. The Court allows $70,000 each, but that only covers services to date, while the Master, in quoting his figures, made provisions for services yet to be rendered.

Winona & Southwestern.—The parties who assume the contract for building this road are Minneapolis men, represented by Gen. A. B. Nettleton, William McIntyre and Col. A. M. Hatch. They have already bought the Mason City & Fort Dodge road, which is in operation about 70 miles, for $1,400,000 and this will be made part of the Southwestern. Twenty miles of the new road from Winona, Minn., must be completed by Aug. 1, 1888, and the road is to be in operation to Mason City by Jan. 1, 1889, and to Omaha, 330 miles, by Jan. 1, 1890.

TRAFFIC AND EARNINGS.

The Inter-state Commission.

At St. Paul, Sept. 16, the complaint of the Mankato Business Men's Association against the Minneapolis & St. Louis for charging higher proportionate rates from Chicago to Mankato than to St. Paul was heard.

At Chicago, Sept. 20, a complaint against the Louisville, New Albany & Chicago alleging excessive charges was heard.

In the case of the Boston & Albany and the Vermont State Grange against the Vermont Central the Commission has made a decision in favor of the Grange. It is held that the Boston & Albany has, on its own behalf, no ground of complaint against the defendants. Its grievance, if any, is that the defendant roads make lower charges on long-haul traffic than it makes. But this they have a right to do. In the high local rates the Boston & Albany has no concern. The latter road said in the argument that it was interested in the question, because if the Central Vermont could lawfully make the higher charge on the short haul the Boston & Albany desired to know it that it might do the same. But this was no reason for instituting these proceedings, for any case must stand on its own facts, and it would not follow that what would be lawful for the Central Vermont would be lawful for the Boston & Albany, the circumstances and conditions of whose traffic might be altogether different.

The main reliance of the defense was upon the showing of the competition which the defendants must meet in their long haul traffic. The circumstances and conditions that must justify the greater charge on the shorter haul over the Central Vermont line, must be such as spring from trunk line competition. What, then, are the peculiar circumstances and conditions which constitute the difference between the case before us and cases of railroad competition in general? The principal difference must be found in the fact that the trunk lines have interior or shorter lines, as compared with the line of the defendants, and the latter are compelled, therefore, to make low rates on their through traffic. This is a necessity of the situation, but it is a necessity which exists whenever long and short lines compete. The long line must accept the rates made by the short line, and perhaps make concessions from them. In this respect there is nothing peculiar in the position of these defendants.

The conclusion is that the Central Vermont and the other defendants concerned with it in inter-state traffic between Boston and St. Albans and Boston and Ogdensburg respectively, including those points, must wholly cease and desist from charging or receiving in respect to any part of such traffic a greater compensation for transportation of a like kind of property for a shorter than for a longer distance over the same line in the same direction, the shorter being included within the longer distance. In performing this duty we neither do nor with propriety can express any opinion upon the intrinsic reasonableness or justice of the rates heretofore imposed, except to this extent: That we do not think it was shown by the evidence that when the local traffics are made to conform to the letter of the law as above directed they will be unreasonable.

East-bound Shipments.

The shipments of flour, grain and provisions from Chicago eastward to seaboard points amounted last week to 25,979 tons, against 25,651 tons far the week previous, an increase of 328 tons. The percentages carried by the different roads were as follows: Chicago & Grand Trunk, 12.6 per cent.; Michigan Central, 29.2; Lake Shore & Michigan Southern, 14.0; Pittsburgh, Fort Wayne & Chicago, 19.0; Chicago, St. Louis & Pittsburgh, 4.0; Baltimore & Ohio, 13.4; New York, Chicago & St. Louis, 7.7; Cincinnati, Indianapolis, St. Louis & Chicago, 0.1.

Demurrage Charges.

A meeting of the General Managers of the various roads centring in Omaha was held in Chicago, Sept. 17, for the purpose of bringing about some uniform action in regard to demurrage charges on freight detained at Omaha and South Omaha. Shippers have been in the habit of delaying cars to such an extent as to seriously embarrass the roads, and some of the roads have found it necessary to make demurrage charges for the detention of cars. The meeting is said to have agreed upon a uniform schedule of rates.

Export Freight Rates.

Representatives of the New York Central, Erie, Michigan Central, Baltimore & Ohio, Pennsylvania and other roads, met in New York last week and considered the cutting of rates to the seaboard on freight from the West for export. The reports say that the meeting ordered rates restored to tariff Sept. 19, though the roads had never acknowledged that these rates were at vaeiance with the tariff, and moreover should have given the required ten days' notice before making any advance.

Compromise Classification.

A Chicago dispatch, referring apparently to the recent meeting of General Freight Agents at Niagara Falls, says that the roads west of Chicago and those east have agreed on a classification of eight classes, which is two more than the Trunk Line and two less than the Joint Western, and that a committee of fifteen has been appointed to take up the work of revision and consolidation.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of July:	1887.	1886.	Inc. or Dec.	P.c.
Atch., T. & S. F..	$1,534,902	$1,303,110	I. $231,792	17.7
Net ...	672,897	659.759	I. 13,138	1.9
Cairo, V. & C. ...	65,345	70,507	D. 5,162	7.3
Net ...	28 793	32,097	D. 3,304	10.2
Cape F. & Y. V..	19,429	14 542	I. 4,887	33.7
Net ...	8,591	4.750	I. 3,841	80.0
Ches. & Ohio.....	389,081	405 509	D. 16,428	4.0
Net ...	130,887	135,071	D. 4,184	3.0
Eliz., Lex. & B. S.	98.980	95,846	I. 3,134	3.2
Net ...	41,690	35,585	I. 6,114	17.1
Ches , O. & S. W..	174,852	147.418	I. 27,434	18.6
Net ...	78,472	61,007	I. 17.465	28.5
Chi., Bur. & Q....	2,167,801	2,330,741	D. 162,940	7.9
Net ...	970.474	1,108.954	D. 198,480	16.9
Chi., Mil. & St. P.	1,846,485	2,036,726	D. 190,241	9.3
Net ...	695,518	838,928	D. 143,416	17.0
Den. & R. G.....	678,170	610,082	I. 68,088	11.9
Net ...	299.670	228,606	I. 71,064	31.0
Den. & R. G. W..	105,379	85.742	I. 19,637	22.9
Net ...	35.999	22,450	I. 13,549	60.2
Det , B. C. & Al..	51,350	22,432	I. 28,918	129.0
Net ...	24.366	13,353	I. 11.013	82.1
Kentucky Cent...	101,868	95,681	I. 6.187	6.4
Net ...	51,170	45.379	I. 5,791	12.7
Lou., N. O. & T ..	115,285	110.664	I. 4,621	4.1
Net ...	17,311	23,676	D. 6,365	26.6
Mil., L. S. & W..	326,214	248,444	I. 77,770	31 3
Net ...	153,814	93,490	I. 60.324	64.5
Minn. & N. W....	130,536	44,632	I. 85,724	122.6
Net ...	31.491	17,504	I. 13,987	79 9
Minn. & St. L....	106,683	118,394	D. 11.711	9.8
Net ...	30,405	40,881	D. 4,476	10.9
Northern Pacific..	1,202,576	1,100,026	I. 102,550	9 2
Net.... ...	545,718	534,527	I. 11.191	2.0
Ohio & Miss.....	322,692	335,431	D. 12 739	3.7
Net	100,804	110,963	D. 10,159	9.1
Oregon Imp. Co..	376,393	301,606	I. 74,787	24.7
Net.... ...	117,462	120,062	D. 2,606	2.1
Oregon R. &N.Co.	400,374	421,881	D. 21,507	5.0
Net	196,985	173,708	I. 23,277	13.4
Penn. Western Lines:				
N'west. Sys....	1,496,188	1,374,986	I. 121,200	8.8
Net	574,263	622,862	D. 48,599	7.8
S'west. Sys.	1,173,156	1,022,466	I. 150,690	14.7
Net	320 810	254 298	I. 66,512	26.1
Tot. W. Pitts.....	2,669,342	3,397,452	I. 271,890	11.3
Net	895,073	877,160	I. 17,913	2.0
South Pac. Co.:				
Gal., H. & S. A.	251,414	236,576	I. 14,838	6.2
Net	7,728	69,459	D. 61,731	88.8
Louisia. &West.	70,540	56,802	I. 13,738	24.1
Net	34,190	33.079	I. 1,111	3 3
Morgan's L. &T.	297,388	277,393	I. 19.995	7.2
Net	64,887	49.914	I. 14,973	30.0
Texas & N. O..	107,750	97,434	I. 10,316	10.5
Net	55,499	50,703	I. 4,796	9.4
Total	$727,092	$668,205	I. $58,887	8.8
Net	162,304	203,155	D. 40,851	20.1
Tol. & Ohio Cen..	80,264	67,759	I. 12,505	18.4
Net	23,472	21,097	I. 2,435	11.5
Total (gross)....	$13,660,913	$13,032,830	I. $628,083	4.8
Total (net)	5,319,375	5,462,102	D. 142,727	2.6

Eight months—Jan. 1 to August 31:	1887.	1886.	Inc. or Dec.	P.c.
Atch., T. & S. F.	$12,107,798	$9,586,429	I. $2,521,369	26 3
Atlantic & Pac...	1,760 999	914,009	I. 846 990	92.6
Buff., N. Y. & P..	1,802,004	1,704,080	I. 98.014	5.7
Buff., R. & Pitts.	1,297,523	872,590	I. 424.933	48.4
*Burl., C. R. & No.	1,726.183	1,640,112	I. 86.071	52.4
Cairo, V. & Chic.	489.304	411,995	I. 77,459	18.8
California South.	934,918	428,707	I. 506,211	118.0
Canadian Pac. ..	6,804,091	6,180,823	I. 723.268	11.8
Central of Iowa...	815,424	813,902	I. 13.502	1.6
Ches., O. & S. W..	1,178,871	1,025,085	I. 153,786	15.0
Chic. & Atlantic..	1,388,603	978,929	I. 409,674	41.8
Chi. & East. Ill..	1,290,970	1,100,468	I. 190,502	17 3
Chi., Mil. & St. P.	15,047,472	14,646,201	I. 401,271	2.7
Chi. & W. Mich..	905,625	892,744	I. 12 881	1.4
C., L. St. L. & C..	1,719,157	1,652,681	I. 68 476	4.1
C., Jack. & Mack.	292,311	257,672	I. 34,639	13 4
*Cin., N. O.&T. P.	2,007.267	1,704,552	I. 302,715	17.7
*Ala. Gt. South	908,480	687,779	I. 220,701	32 6
*N. Ori. & N. E.	385.543	357,512	I. 28,031	7.8
*Vicks. & Mer..	296.782	292,746	I. 4,036	1.3
*V., Shre. & P..	293,742	250,784	I. 42 958	17.1
Cin., R. & Ft. W..	260,695	241,088	I. 19,607	8 1
Cin., W. & Balt..	1,372,376	1,244,409	I. 127,967	10.2
*Cleve., Ak.& Col.	348,174	336,416	I. 11.758	3.1
Cleve. & Marietta	194,950	179,666	I. 15.284	8.4
Col. & Cin. Mid..	209,411	198,407	I. 11,004	5 5
Col., H. V. & T...	1,686.056	1,390,202	I. 295,854	21.2
Den. & R. Grande	4,942,707	4,104,662	I. 838,045	20 4
*Den. & R. G. W.	651,782	610,731	I. 41,051	6.7
Det., B. C. & Al..	3 2,297	141,297	I. 181,000	128.0
Det., Lan. & No..	741,493	777,247	D. 35,754	4 6
*E. Ten., Va. & G.	3,070,729	2,457,594	I. 613,135	24 9
Evans. & Ind.....	155,340	121,148	I. 34 192	28 2
Ev. & Terre H....	553,523	505,965	I. 47,558	9.0
Flint & Pere Ma.	1,701,233	1,423,839	I. 277,394	19.4
Fla., Ry. & N. Co.	669.905	604,936	I. 64,969	10.7
Ft. W. & Den. C.	425,190	242,636	I. 182,554	75.2
Gr. Rapids & Ind.	1,529,143	1,288,795	I. 240,348	18.6
Grand Tr. of Can.	11,370,114	10,521,873	I. 848,241	8.0
*Houston & T. C.	1,437,564	1,404,828	I. 32,736	2.3
Ill. Cen. (Ill. Div.)	4,685,881	4,241,076	I. 504,805	12.0
South Div. ...	2,368,277	2,335,305	I. 32,972	1.4
Cedar Falls & M..	81,190	109,428	D. 28,239	25.8
Dub.& Sioux C ..	517,426	574,494	D. 57,068	9.9
Iowa F. & S. City	411,600	370,515	I. 41,085	11.0
Ind., Bloom. & W.	1.684.122	1,606,761	I. 77,361	4 8
Ind., Dec. & Spr..	271.401	266 623	I. 4,778	1.7
*K C., Ft. S. & G.	1,664,869	1,500,062	I. 164,807	10 9
*K. C., Sp.& Mem	1,252,045	891,583	I. 360,462	40.4
*K. C., Cl. & Spr..	157.447	142.311	I. 15,136	10.6
Keok. & West	199,170	190,604	I. 8,566	4.4
Lake Erie & W....	1,285,803	1,090,036	I. 195,767	17.9
Lehigh & H. R....	165,700	138,604	I. 27 096	19 5
Long Island.....	2,160.332	2,125,549	I. 140,783	6.9
Lou., Ev. & St. L.	636 585	527,559	I. 109,026	20.6
Louiv. & Nash....	10,104,823	8.788,307	I. 1.316.516	14.11
Louis., N. A. & C.	1.436.574	1.139,690	I. 296,884	26.1
L., N. O. & Tex..	1,166,138	951,321	I. 214,817	22 5
Marq., H. & O..	686,723	656,550	I. 30,173	4.5
*Memphis & Chas	988,177	769,048	I. 219,129	28.4
†Mexican Cen....	3,07 ,157	2,389,895	I. 681,262	28.5
*‡Mex.Na.(S.Div..	686,826	658,671	I. 28,155	4 2
Mil., L. S. & W	2,124.027	1,442,662	I. 681,365	47.2
Mil. & Northern..	603,435	400,493	I. 203,342	50.7
Minn. & North.W.	783.990	268,817	I. 515.173	117.2
Mobile & Ohio....	1,483 882	1,273,888	I. 209,994	16.4
N. Y. C. & H. R..	22,837.244	20,571,212	I. 2,266,032	11.1
N. Y., Ont. & W...	988,793	870,380	I. 109,413	12.4
Norfolk & West..	2,565.549	1,974 990	I. 590,559	29.9
Northern Pacific..	7,905.930	7,313 641	I. 592 189	8 6
Ohio & Miss.....	2,607,577	2,444.251	I. 163,326	6.7
Ohio River	197,589	116,347	I. 81,233	69 2
Ohio Southern..	358,607	307,842	I. 50,765	16 4
Peoria, Dec. & E.	356,888	501,488	I. 55 400	11 0
Pitts. & West. ...	1,271 085	973,441	I. 297,644	30.5
Rich. & Danville..	2,641,424	2,506,985	I. 134,439	5.3
Va. Mid. Div....	1,037.383	965,427	I. 71,956	7.4
Chas., C. & A..	487.644	477,636	I. 10,018	2.9
Col. & Gr. Div..	311.935	372,395	D. 60.460	29 0
West. N. C. Div.	440,551	332 400	I. 108.151	32.5
Wa , O. & W....	74.100	67.900	I. 6.200	9 1
Ash. & Sp. Div.	36,400	22,030	I. 14.370	65.3
St. Jo. & Gd. I..	684,569	733,333	D. 48,764	6.6
St. L., A. & T. H.:				
Main Line.....	882,732	787,048	I. 95.684	12.1
Branches	572,855	467,481	I. 105,374	22 5
St. L., A. & Tex ..	1,415,610	1,025,023	I. 390,581	38 1
St. L. & San F...	3,772,125	2,911,779	I. 869,346	29.9
St. P. & Duluth...	990,708	872,079	I. 118 689	13.7
St. P , M. & Man..	4,760,387	3,148,808	I. 613 579	19 4
Shenandoah Val.	551,213	447.743	I. 103 470	23 1
Staten I'd	591,860	546 833	I. 48,027	8 7
Texas & Pacific..	3,455.619	3,399,662	I. 55,957	1.6
Tol., A. A. & N.M.	318,788	221,297	I. 97.491	44.0
Tol. & Ohio Cen..	642,896	492.298	I. 150.598	30.5
*Tol., P. & West..	554,656	522.703	I. 31,953	6.1
Valley (Ohio).....	416.028	373 147	I. 42 881	11.4
Wabash (West)..	4.180.984	3,515,782	I. 665.202	18.9
Wheeling & L. E.	480,554	376,092	I. 104,462	27.7
Wisconsin Cent...	1,348,322	968,568	I. 381,754	39.4
Min., St C. & W.	323,179	164,120	I. 159,059	96.9
Wis & Minn...	193,390	116,119	I. 77,271	66.5
Total.....	$196,251,225	$170,700,088	I. $25,781,412	....
			D. 23,275	....
Net.....			I. 25,551,137	15.5

* Only three weeks of August in each year.
† Mexican Currency.
‡ Not including Chi., Wis. & Minn.

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Cotton.

The cotton movement for the week ending Sept. 16 is reported as below, in bales:

	1887.	1886.	Inc. or Dec.	P. c.
Interior markets:				
Receipts.....	77,524	48.360	I. 29,164	60.2
Shipments.....	59,703	47.255	I. 12,511	26.4
Stock.....	52,512	50,862	I. 1,650	3.2
Seaports:				
Receipts.....	126,041	71,915	I. 54,126	75 2
Exports.....	33,770	24,9 9	I. 8,841	35.4
Stock.....	192,752	213,986	D. 21,234	9.9

Coal.

The coal tonnages for the week ending Sept. 17 are reported as follows:

	1887.	1886.	Inc. or Dec.	P.c.
Anthracite.....	681,572	732,072	D. 50,500	6 8
Bituminous.....	469,815	375,603	I. 94,212	25.0

The coal tonnage of the Pennsylvania road for the week ending Sept. 10 is reported as follows:

	Coal.	Coke.	Total.
Line of road.....	183,532	86 707	270,239
Year to Sept. 10.....	7,077,221	2,339,555	9,416,776
To Sept. 10, 1886.....	5,771,190	2,377,745	8,148,915

Cumberland coal shipments for the week ending Sept. 17 amounted to 68,145 tons and for the year to that date 2,219,159 tons.

Passenger Rates.

The excitement concerning the cutting of passenger rates between eastern and western points seems to have largely subsided, though the scalpers are said to be still doing a lively business in selling the return portion of excursion tickets to passengers going west from New York. The Ohio & Mississippi is said to have made slight reductions on various east-bound rates from St. Louis.

A Chicago dispatch of Sept. 21 says that the Niagara Falls short line has made a slight reduction on second class tickets to Boston via the West Shore and Fitchburg roads, and that the officers of the Central Traffic Association tried to dissuade the officers of the road from this action.